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Rebuilding Customer Confidence and Satisfaction

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A large, bold checkmark is positioned to the left of a stack of several papers. The papers are fanned out, showing various text and diagrams, and are resting on a dark, shadowed base.

in this issue...

- **Advise and Consent.** It is estimated that 70 per cent of all U.S. companies have used the services of an outside consultant at one time or another. For what purposes—and with what results? This month's opening feature, based on an AMA-sponsored survey, discusses management's varying experiences and attitudes with regard to the capability of consultants, methods of selection, fees, types of assignments, and working relationships within the company. In addition, a dozen prominent consultants report on some of the problems *they* worry about.
- **... and You're Another.** A cartoon feature, based on this survey, that illustrates some of the complaints that executives and consultants have about each other (page 11).
- **Service with a Smile.** Let no company complain about the inroads of foreign competition or the fickleness of the consumer, says GEORGE M. UMBREIT (page 15), until its own house is thoroughly in order on two basic counts: product quality and customer service. An uncompromising attitude toward both objectives may have an old-fashioned ring about it, but it's as timely as tomorrow's profit-and-loss statement.
- **5,000-mile Checkup.** For the many companies that have now had two, three, or four years' experience with computer installations, the time has come to check up on the results to date—to determine how well the system is serving the purposes for which it was installed, to adapt it to changed conditions within the company, and to take advantage of new developments in technique and hardware. On page 21, D. RONALD DANIEL describes the steps by which several companies have conducted EDP audits—with considerable success.

—THE EDITORS

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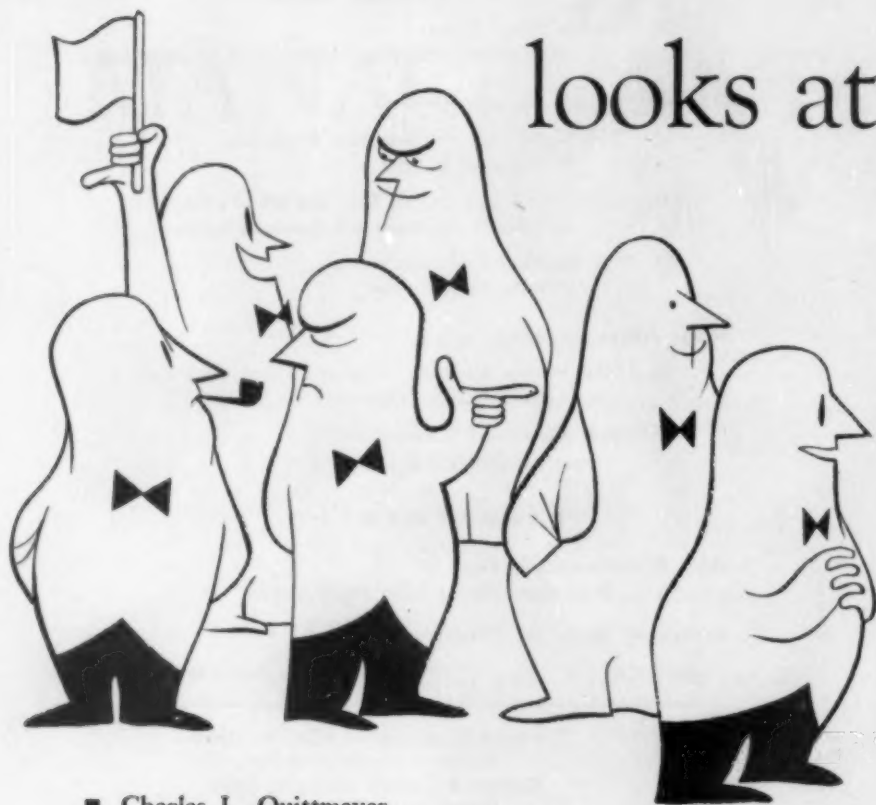
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Management

looks at

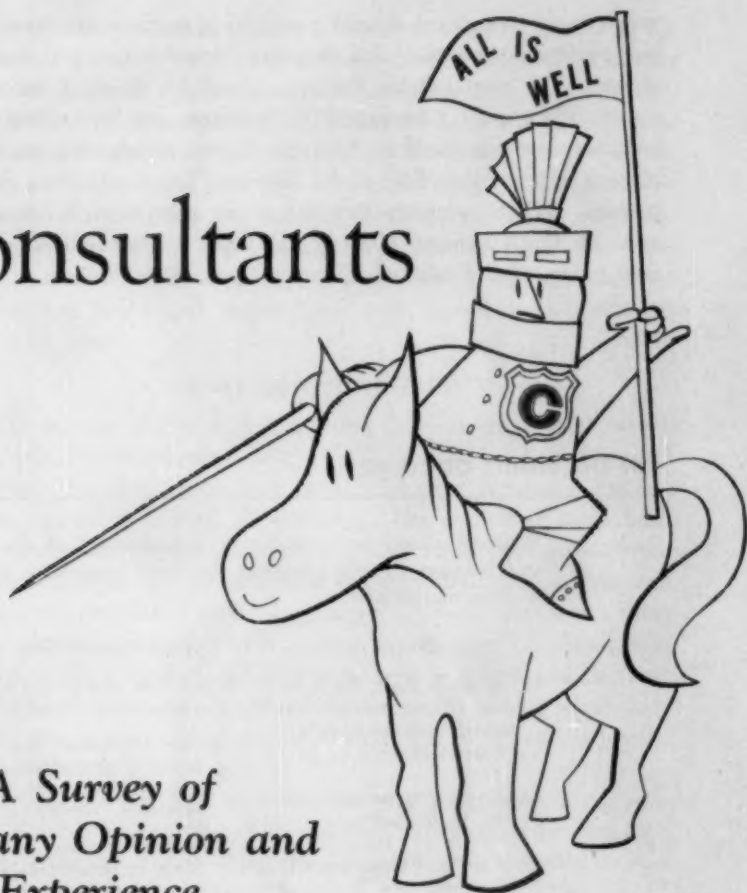


■ Charles L. Quittmeyer

ARE MANAGEMENT CONSULTANTS WORTH THEIR SALT? Many executives would answer with a resounding "Yes!"—but others aren't so sure, and some are convinced that a consultant's services are less than worthless.

The men who elicit this wide variety of opinions are members of a profession that has grown and thrived, perhaps inevitably, with

Consultants



A Survey of Company Opinion and Experience

the increasing complexity of business. Estimates of the number of consultants practicing their trade in the United States vary widely—partly because of some differences of opinion about just what a

Dr. Quittmeyer, who conducted this survey under the auspices of the American Management Association, is Associate Professor of Commerce at the University of Virginia's McIntire School of Commerce.

management consultant is, and partly because there are many college professors and one- and two-man "firms" offering consulting services. The most reliable figures are probably those of the Association of Consulting Management Engineers, the blue-ribbon professional society in the field. Although its own membership presently consists of fewer than fifty of the older and larger consulting organizations, ACME estimates that there are more than 1,700 firms and, all told, between 30,000 and 40,000 practitioners in the field today, with combined billings of some \$550 million.

ON THE MERITS OF COUNSEL

When it comes to management consulting, both knockers and boosters can find support for their arguments in the wisdom of the past . . .

Pro . . .

When all is done, the help of good counsel is that which setteth business straight.
(*Francis Bacon*)

Good advice is beyond price.
(*W. G. Benham*)

Men see and judge the affairs of other men better than their own. (*Terence*)

The worst men often give the best advice. (*P. J. Bailey*)

In the multitude of counsellors there is safety. (*Old Testament*)

He is the best of all men who follows good advice. (*Zeno*)

He who counsels, aids.
(*Plautus*)

. . . and Con

Good but rarely came from good advice. (*Lord Byron*)

To one who knows, it is superfluous to give advice; to one who does not know, it is insufficient. (*Seneca*)

Extremely foolish advice is likely to be uttered by those who are looking at the laboring vessel from the land.
(*Arthur Helps*)

Nobody can give you wiser advice than yourself. (*Cicero*)

Good advice is one of those injuries which a good man ought, if possible, to forgive, but at all events to forget at once. (*Horace Smith*)

Advice comes too late when a thing is done. (*Samuel Richardson*)

At one time or another, about 70 per cent of all companies in the country—including small ones—have availed themselves of the services of one of this horde of professional advisors. What do they really think of consultants? To find out, the American Management Association recently sponsored a survey in companies throughout the nation, asking top managers their opinions of consultants: How valuable are they? Do they get results? Is the expense worthwhile? How well do they work with company personnel? Their answers to such questions as these provide a good view of management's experience to date—and suggest some areas in which improvements could be made.

WHAT CONSULTANTS DO

The services provided by consulting firms are many and varied, and they may be classified (as the 1958 directory issue of *American Business* has done) into more than a hundred categories, ranging from accounting to work simplification. The services of some firms are narrow and highly specialized, but others offer a broad spectrum of services that cut across several business functions and through several hierarchical levels of a company. (Some authorities don't even consider an organization to be a management consulting firm unless it offers more than one type of service; others include those that specialize in one area of management, but almost all exclude such firms as advertising agencies, banks, law firms, and industrial engineers from this category.)

Consultants offer help with top-level, operating, or technical matters. Stanley P. Farwell, while president of the Business Research Corporation in Chicago, listed the most commonly available services in functional classifications:

- *General problems:* Organization and reorganization; operating policies, programs, and controls; reports for control and guidance; expansion and diversification; compensation and incentives; economic studies; manuals of executive functions; executive recruiting; professional directorship.
- *Financial problems:* Budgets; cost control; fiscal policy; accounting systems; capital needs; taxes; credit and collections.
- *Production problems:* Facilities and layout; production and inventory control; incentives; materials handling; processing; time and motion studies; quality control; scheduling and dispatching; work simplification; procurement; maintenance; cost reduction; safety.
- *Marketing problems:* Distribution channels; merchandising; compensation; market research; sales quotas; pricing; promotions; product acceptance; office procedures; warehouse methods; shipping procedures.

- *Office management problems:* Systems; layout; equipment; incentives; time studies; job simplification; services.
- *Personnel problems:* Job evaluation; labor relations; wage and salary administration; policies and practices; training; rating; evaluation of managerial jobs; employee benefits; aptitude testing; employee attitudes; procedures; wage surveys.
- *Miscellaneous problems:* Appraisals; construction.

Long as this list is, it doesn't pretend to be exhaustive. Consultants will fearlessly attack any business problem you may have—and if you don't have a problem, they'll be glad to come around and try to find one for you. What's more, the trouble spots they do uncover are likely to be real weaknesses that might have caused a lot of grief if left unchecked.

GROWING PAINS

Many of the problems that have caused managers to send out a call for the consultants result from two basic causes: corporate growth—and lack of it. Organizational growth can spread managers too thin over their jobs and lead to problems in delegation, excessive paperwork and red tape, lack of organization, overworked executives, the burgeoning of committees, conflict, and confusion; lack of growth can cause low profits, declining sales, loss of accounts, and inability to meet the needs of growing and changing markets. And harassed executives have often drawn on the skills of a consultant to get their companies back on the track again.

This is not to say that consultants are always called in to breathe life back into an expiring corporate body. Although they have been known to snatch a failing company from the jaws of dissolution, consultants are more likely to be employed by healthy companies that want capable advice about small problems that might develop into major headaches, or objective opinions on prospective courses of action. Arthur Slade, of the consulting firm of Rogers, Slade & Hill, has said that half his organization's jobs are calls to handle specific problems, while the other half are advisory and "idea-swapping" assignments.

In fact, the reason for hiring a consultant mentioned most often by respondents to the survey questionnaire was the desire to get an outside viewpoint. Second, and about half as frequent, was lack of skills or experience among regular employees, and third, with

almost as many mentions, was lack of time for regular employees to handle the job. The fourth most frequently mentioned reason was the need to do jobs that occurred too infrequently to warrant hiring additional specialists to handle them, followed by the desire to get reassurance that a proposed solution or course of action was correct.

In such cases, and for almost any other problems that management may find difficult to handle, management consultants stand ever ready to leap into the breach.

SATISFIED CLIENTS

Of course, being ready and willing isn't enough; the consultant must also be able to handle the job. To find out how well consultants handle their assignments, the questionnaire asked companies that had recently had occasion to use them—about 62 per cent of the 142 respondents—how well satisfied they were with the results. On the whole, the response was heartening: In companies where consultants had recently completed a job, 47 per cent were highly satisfied with the results. Another 38 per cent were fairly well satisfied, and the remaining 15 per cent reported either low satisfaction or none at all.

Among companies where the consultants were still at work, satisfaction ran even higher: 60 per cent highly satisfied, 30 per cent fairly well satisfied, and only 10 per cent with little or no satisfaction in the progress being made. If this indicates anything at all, it may be that companies using consultants tend to be somewhat sanguine in anticipating results while the consultant is actually on the job.

The rather high degree of satisfaction reported by companies using the services of consultants indicates management's opinion that these business advisors do make a worthwhile contribution to their organizations. And the value of these services is further indicated by the fees that companies are willing to pay to get them.

PAYING THE PIPER

Not every company answered the question about fees, but the answers that were received indicate that compensation arrangements are apparently flexible and adaptable to the needs of the user and the consultant. In addition to the usual arrangements for

per-man-per-day rates and per-man-per-day rates plus expenses, respondents mentioned hourly rates, "nominal" rates, retaining fees, flat monthly rates, flat annual fees, per-man-per-month rates, per-man-per-week rates, per-job rates, and different rates for different men in the consulting firm. (Rates for partners or principals are often much higher than staff associates' rates—e.g., \$350 per day for a partner, \$150 for an associate.)

The most common basis of compensation is apparently per-man-per-day rates, plus expenses (mentioned by 29 respondents), followed by a straight per-man-per-day basis (reported by 18 respondents).

HOW MUCH IS TOO MUCH?

The total amount spent on consulting services also varied widely. Naturally, the total depends not only on the rate, but on the length of the assignment and the number of consultants actually on the job. Among responding companies, about half the consulting jobs were completed in less than three months; another 20 per cent took four or five months, and about a third took more than five months. The man-days actually worked by the consultants ranged from 1½ to 980, with a median of 45.

These differences, plus the varying rates of compensation (actual per-man-per-day rates ranged from \$40 to \$500, with a median of \$175), naturally resulted in a wide range of total prices paid for consulting aid. Of the 43 companies reporting their total costs, three paid under \$1,000; nine were in the \$1,000-\$4,999 range, ten in the \$5,000-\$14,999 range, nine in the \$15,000-\$24,999 range, six in the \$25,000-\$49,999 range, four in the \$50,000-\$99,999 range, and two paid more than \$100,000 for the advice of a consultant.

This isn't the kind of change that most businessmen have lying around loose in their pockets, and many of the survey respondents feel that the cost of consulting aid is a bit steep. Of the 119 companies that gave their opinions about consultants' charges in general (including 86 that had used consultants recently and 33 that had not), 59 per cent felt that, on the whole, consultants' prices are high; 35 per cent thought their charges were about right, and

(Continued on page 63)

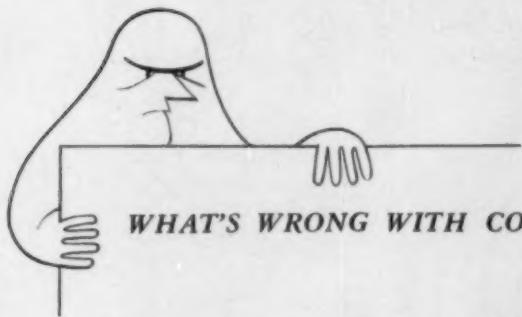


**When You
Call Me That,
Smile!**



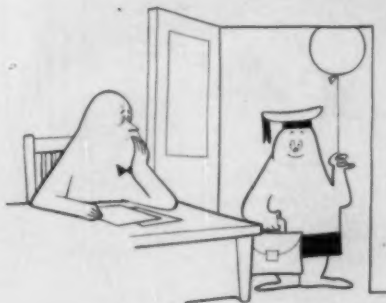
**EXECUTIVES AND CONSULTANTS
EXCHANGE A FEW VOLLEYS**

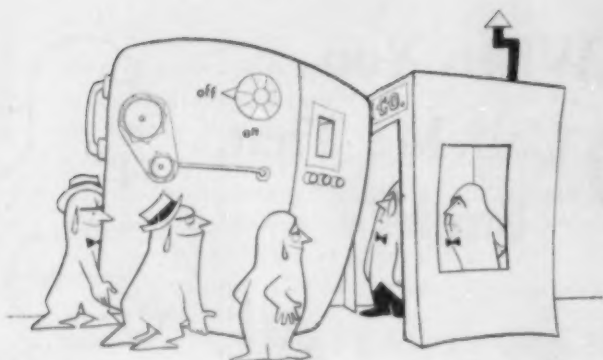
Even the best of friends will fall out on occasion, so it isn't surprising that executives and management consultants have sometimes been known to view each other with a jaundiced eye. Among the verbal brickbats flying between some members of each profession, those that follow are probably most often heard . . .



WHAT'S WRONG WITH CONSULTANTS:

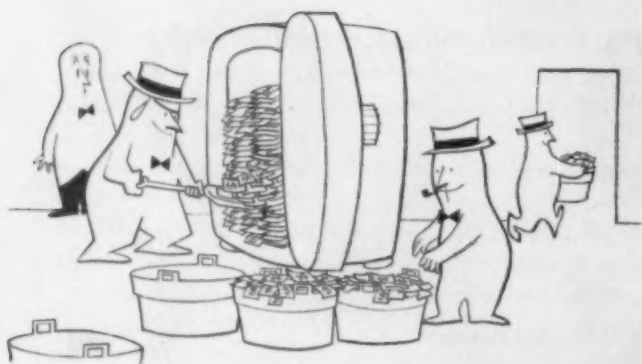
They lack experience.





Their ideas are impractical.

They aren't qualified.



They charge too much.



They use high-pressure selling tactics.

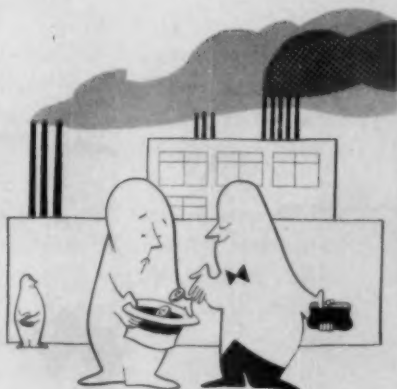


WHAT'S WRONG WITH MANAGEMENT:



They let their problems go too long before calling a consultant.

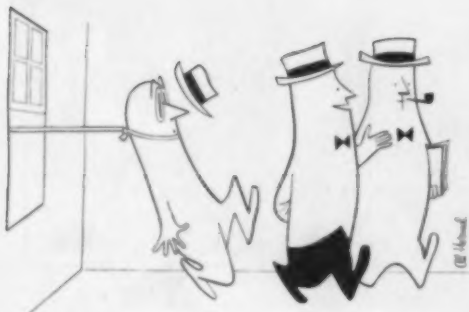
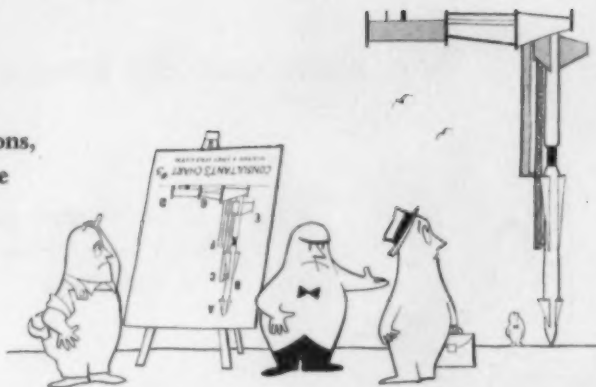
They don't pay enough, in view of the savings a consultant makes possible.





**They don't really want
objective analysis; they
want reassurance.**

**They misuse
recommendations,
then blame the
consultant.**



**They hire the
consultant's
staff away.**

REBUILDING CUSTOMER CONFIDENCE AND SATISFACTION

George M. Umbreit

President, The Maytag Company

CONSUMER DISSATISFACTION—real or imagined—is hurting American business. Never before have so many products of such high quality been available to so many people—and probably never before have so many customers been dissatisfied with what they're getting.

The reasons for this strange state of affairs are many, but the main factor is probably that we have entered what has been called an "economy of abundance." No longer, as in the postwar sellers' market, are customers waiting eagerly to snap up whatever products industry can produce; goods are available in profuse supply, and customers are in a position to pick and choose.

Quality looms large in the mind of today's consumer; as many manufacturers can testify, the feeling that "they don't make 'em the way they used to" is more prevalent than ever. Sometimes this feeling is a reflection of higher standards on the part of the consumer; sometimes it has been given justification by the poorly made products ground out by short-sighted manufacturers; sometimes it is based on resentment of the careless service policies that some companies found expedient during the postwar selling boom. Regardless of its origin, the feeling is harmful—and far from rare.

The consumer's confidence has been further shaken by unrealistic advertising—after all, he is entitled to doubt that every product on the market is the "best"—and by the attacks, not entirely irresponsible, of best-selling authors who decry the greed and immorality of companies that "don't make 'em the way they used to."

QUALITY—OR CONSEQUENCES

This is not to say that we are approaching a crisis of confidence—a consumer revolution that will topple the giants of American industry. By and large, consumers are pleased with the quantity and quality of most of the goods available to them. But at one time or another, almost everyone has been unhappy with a product—so much so that he has complained loudly, or, at least, has sworn off the manufacturer's brand for life. And in an economy in which success and profitability depend on the opinions of the consumer, no company can long afford to ignore the dissatisfactions of its customers.

It is rather obvious why the loss of consumer confidence can be a serious, if not fatal, blow to any company. In the first place, it is generally acknowledged that the recommendations of a satisfied customer are the best form of advertising, and a company whose customers will buy, and encourage others to buy, its products is in an enviable position. In addition, expanding foreign competition makes it clear that the consumer is well able to go elsewhere if he becomes dissatisfied with domestic goods—and surveys have indicated that one of the important reasons why people prefer foreign products is their belief that they are "better made" and "built to last."

Even if there were not these obvious practical reasons for seeking

"No company can complain about the inroads of foreign competition or the fickleness of the consumer until its own house is in order on two counts: product quality and customer service . . ."

● ● ●

to satisfy the consumer, the plain fact remains that we are not in business to produce goods and services, but rather to meet the needs and desires of people. It may have an old-fashioned ring to it, but it is still true that a company that has failed to provide satisfaction for its customers has lost its only moral and economic justification for being.

No company can complain about the inroads of foreign competition or the fickleness of the consumer until its own house is thoroughly in order on two counts: product quality and customer service.

PRODUCT QUALITY

Product quality is hardly a controversial subject; everyone believes in it. But as products become increasingly complex, and as our modern way of life depends increasingly on the services we get from our machines and appliances, quality has become more than just desirable—it is a necessity, and achieving it has become the first requisite of effective corporate leadership.

Product Design

Product quality begins with design, and this does not mean merely styling. The manufacturer has a continuing responsibility for emphasis on real design improvements—improvements that reduce the number of moving parts, result in more efficient performance, eliminate known service problems, and simplify the task of the serviceman when repairs are required.

Like most desirable goals, this is easy to describe but a great deal harder to attain. It places on design engineers the burden of

engaging in a constant search for new and better ways of performing old and familiar tasks. The designers cannot forget about a product simply because it has been released for production and placed upon the market; in addition to the search for new ideas and new products, there must be an equally relentless search for ways of improving current products.

The improvements that result might be relatively minor, yet in terms of satisfaction to the user they can be quite important. In the home appliance industry, for example, we could cite some typical examples: the substitution of small balls of polyurethane elastimer, a new material with many of the characteristics of rubber, for lid hinges on automatic washers; changes in cabinet design to give servicemen quicker and easier access to parts that may require service; and improved design in control systems, switches, motors, and other component parts to reduce maintenance problems. Such changes, developed as part of a continuing process, help to insure that the products we offer to our customers will always be better than they have ever been before.

The persons responsible for the design and development of the company's products should have frequent opportunities to get away from their drawing boards and out in the field. There is no substitute for first-hand observation. Written reports, forwarded through the usual corporate channels, are frequently necessary; but the best way to highlight a service problem is to let the man responsible for the design go along on service calls and see the problem for himself.

Product Testing

The manufacturer must also see that new products, redesigned products, or improved products are carefully tested before they are produced for public consumption and placed on the market. Real or imagined marketing deadlines cannot be permitted to take precedence over adequate testing. Industrial designer J. Gordon Lippincott reports one case in which an appliance manufacturer ignored the recommendations of design engineers and others and put out a new model simply to meet a marketing deadline—then had to withdraw it from the market because it had so many bugs in it.

Once a design has been carefully worked out, it should be a relatively simple matter to manufacture a faultless product from the

specifications—but unfortunately, it is not. Even assuming that the design is perfect, problems inevitably arise when specifications from the drawing board are translated into actual processes on the assembly line. The manufacturer who is governed by the goal of customer satisfaction must therefore maintain a careful and detailed program of testing and quality control—one that includes these important aspects:

- The manufacturing division should utilize pilot runs and other testing procedures to spot potential problems and find solutions for them before going into production.

- Actual production models should be subjected to extensive tests of at least two types: "breakdown" tests, under the supervision of trained engineers, to determine basic performance characteristics; and "use" tests, under the supervision of laboratory personnel, to determine whether the product performs as expected under typical household conditions.

- Any new product, or one that has been significantly redesigned, should also be subjected to a period of actual use by consumers. The typical American consumer has an uncanny ability to discover bugs that never show up in any laboratory. This is not only true of the appliance industry; *The Wall Street Journal* has quoted an executive of General Motors as stating that one of the minor but nevertheless frustrating problems that showed up on early models of the Corvair had *never* occurred in all their elaborate testing and proving-ground procedures.

- After a product has passed all other tests and is actually in production, it should constantly be checked to make sure that the quality level is maintained. Quality control specialists have developed a variety of procedures based on mathematical probabilities to check the proper functioning of products produced on an assembly line; these sampling techniques should, whenever possible, be supplemented by a complete final test of each item that comes off the line.

Important as it is, careful inspection or frequent testing is not enough. It is imperative that the manufacturing division maintain close liaison with the design division, so that problems arising from design may be corrected, and a close working relationship with the service department, so that they may take full advantage of field

service experience to discover and correct problems that arise during the product's normal use.

Theoretically, the consumer won't have any problems; all possible trouble areas will be corrected in the plant, before a service problem can develop. Unfortunately, however, this is only theory. In spite of every effort that a manufacturer can make, service problems will occur in the field—and this means that he must maintain a top-flight service department.

SERVICE RESPONSIBILITIES

No manufacturer, however large he may be, can afford to staff the entire nation with servicemen; he must rely on the servicemen employed by the dealers who sell his product. It is vitally important, therefore, that these men be trained—and that they be convinced of the necessity of good customer service. The best dealer is one who is service-oriented—one who believes that the sale has not been completed until the customer is thoroughly satisfied.

Training Servicemen

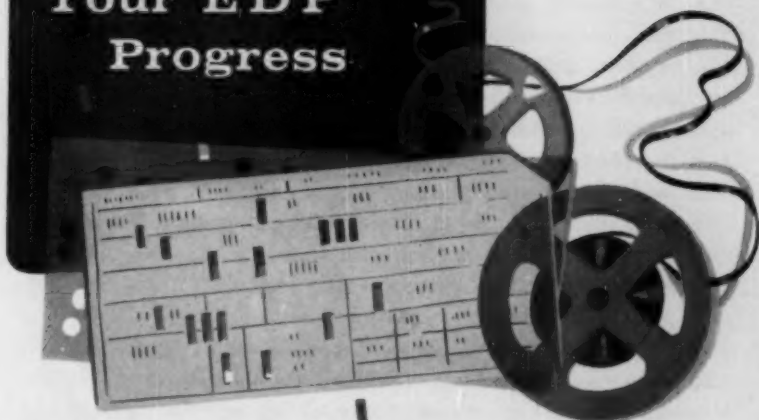
One of the important functions of the service department is to provide opportunities for the men who design the product to keep thoroughly informed about field service problems. Another continuing responsibility is providing feed-back on field experience to the manufacturing division. But perhaps the most important function—in terms of customer satisfaction—is the training of servicemen. Whether we like it or not, the much-discussed corporate image is often seen by consumers only in terms of the man who comes to service the products they own.

The manufacturer is responsible for developing an effective service training program for all his dealers. To conduct this program, he needs superior men with the ability to sell as well as to teach, for the job of service training—if it is well done—requires the trainer not only to impart specific information to servicemen, but also to convince them of the importance of their work.

Because it is important that the trainers and the training techniques be made available to all dealers, the manufacturer must maintain a service training staff in the field as well as in the factory, so

(Continued on page 70)

Measure Your EDP Progress



A "5000-Mile Checkup" for Computer Installations

■ *D. Ronald Daniel*
McKinsey & Company, Inc.

IN THE PAST FEW YEARS, electronic data-processing has accomplished impressive feats for many companies—but for many more it has brought discouraging problems, unforeseen expenses, and even less efficient operations than those that existed before the computer was trundled into the office. Today, a good many companies with established computer installations are pausing for a "5,000-mile checkup" to determine just what, if anything, they have accomplished. With two, three, or four years of EDP experience behind them, they are looking for the answers to some hard questions: How well have we met our objectives? Are the objectives themselves still valid? Have technological advances outmoded our present setup? What effect has the computer system had on the company's organizational structure? In short, have the benefits of EDP been worth its cost?

Within the past six months, for example, two large American companies carried out extensive reappraisals that led them to make major changes in their electronic data-processing efforts:

- In a durable goods company with a large-scale computer system, a three-man task force spent two months evaluating progress made, problems still unresolved, and opportunities ahead. The result: a recommendation to shift EDP emphasis sharply from their well-established accounting-type applications to operations-oriented applications in distribution, inventory management, and production scheduling.
- A similar audit in a transportation company resulted in a complete internal reorganization of the data-processing department and a shift in control of this department within the corporation's organization structure.

Many other companies already are, or soon will be, carrying out similar reviews of their current EDP efforts. In addition to checking on the problems that have been encountered and the progress that has been made, these companies want to insure that rapid and continuing advances in both hardware and "software"—the technical and systems support that speeds the programing and introduction of computers—have not made their thinking and planning out of date.

The organizations that have already completed audits of their EDP progress have followed a general approach that can be adapted to the needs of other companies and used as a guide to an effective reappraisal. This kind of audit, which applies primarily to commercial electronic data-processing systems rather than to scientific or engineering computer installations, should include an examination of five elements: objectives, applications, hardware, organization, and economics.

ORIGINAL OBJECTIVES

A vital first step in the inauguration of an EDP audit in any company is a thorough restudy of the objectives that were set for the program when it was started. Generally, these objectives fall under three headings:

- *Clerical Cost Reduction.* Initially, this was the most popular goal of computer installations. This is understandable when

one realizes that early applications of EDP were heavily oriented toward accounting and paperwork—areas that, despite the inroads of punched-card hardware, still required large organizations of clerical personnel.

- *Improved Management Control.* Many companies, alert to the difficulties of achieving actual payroll savings in their particular situations, focused instead on developing better and more timely information to aid management in controlling the business.
- *Better Management Decisions.* Objectives were occasionally set for improving the company's decision-making. This typically involved attempts to use the computer and operations research techniques for inventory control, production scheduling, and similar applications, although some applications involved the strategic planning of a company.

For purposes of the EDP audit, it is usually possible to infer what the objectives were, even when they were not explicitly stated. This can be done by study of the applications themselves. For example, heavy financial applications (payrolls, accounts receivable, etc.) usually imply cost-reduction hopes, applications in sales statistics generally mean better management control goals, and so forth. The very lack of a formal record of such goals, however, is usually indicative. Not surprisingly, companies that thought through what they wanted to accomplish with their computers, reduced their objectives to writing, and gained the agreement of their management have usually had more success with EDP installations than companies whose programs have been aimless.

Measuring Accomplishments

With its original objectives formally identified (or reconstructed), a company's next job is to measure accomplishment to date by assessing progress toward its objectives. It must also determine whether any changes in objectives are desirable in order to modify the future direction of the company's EDP efforts.

Measuring accomplishment, particularly in companies where cost reduction has been a goal, calls for reviewing financial records—payrolls, monthly rental statements, purchase orders, etc.—to gain a “feel” for the financial implications of the operation. (This is described in more detail in a later step.) Equally important, according

to companies that have conducted successful audits, is a series of fact-finding interviews by the audit team with the company's own management. Such interviews are the best way to determine the extent to which management control has been improved or decision-making sharpened up. During this phase of the audit, answers are sought to such questions as these:

- Is increased information from the computer actually used?
- Has there been any formal program of coaching to teach managers how to use the new information?
- Have management habits or practices in connection with decision-making or control been altered? If not, why not?
- Is there any discernible effect on profits or competitive position—e.g., lower inventories, better customer service, etc.?
- What is the real value of getting information more quickly?

Soundness of the Objectives

The next question, of course, concerns the validity of the original objectives as guidelines to future efforts. Quite often companies find that key factors affecting their business several years ago have changed in significance. Of special importance are these kinds of changes:

1. *Product Line Changes.* In the past five years, many companies have gone into completely new businesses. Whether by acquisition or through the fruits of an internal R&D program, diversification has been prevalent in American business. Chances are good that, if a company has entered one or more new businesses in a major way, the objectives of its data-processing program should be re-evaluated.

2. *Organization Changes.* Organization changes represent another force that must be considered in assessing the present relevance of data-processing objectives. If, for example, a company has recently become divisionalized, the effect of this change on the possible goals of an electronic data-processing program could be significant.

3. *Management Changes.* Shifts in top management personnel should also be taken into account in reviewing the objectives of a company's EDP program. New appointments may mean new attitudes, new interests, new degrees of understanding toward com-

puters. Perhaps a former executive vice president was strong on cost reduction, whereas his successor may be much more interested in the impact of computers on the company's decision-making process.

In addition to exploring the significance of possible changes of these kinds, companies have found that two other steps are needed to make a complete appraisal of the soundness of the present objectives of a computer installation. The first involves a detailed study of the current status of computer applications; the second is an appraisal of the effect of hardware and technological improvements on the company's program.

REVIEW OF APPLICATIONS

This phase of the EDP audit usually starts with an inventory of present computer applications. It is best not only to identify the applications but to determine as well the frequency of processing, the approximate main computer and auxiliary equipment time per processing cycle, and the department that is the primary user of the end results. This inventory simply puts the major applications in perspective so the audit can address itself to the important issues.

After completion of the application inventory, most organizations that have achieved real success through their audits have reviewed these four issues:

- Appropriateness of applications
- Success of applications
- Degree of application integration
- Systems support from computer manufacturer.

Appropriateness of Applications

One of the most serious curbs on EDP progress has been the misapplication of hardware. Too often early applications were selected on the basis of their then-current state of mechanization or because they happened to be responsibilities of the executive in charge of the computer.

Instead, the criteria for application selection should be based on the potential contribution the computer can make to the well-being of the company. This means thinking in terms of the areas of the business that are critical for competitive success. If an organization picks its applications by relating them to these crucial aspects of

its business, it enhances the likelihood that it will receive genuine benefit from its computer system.

A food-processing company, for example, identified raw material procurement, advertising, and distribution as the three factors that made for success in its industry. Although advertising did not lend itself to computer treatment, this company developed several important applications in purchasing and inventory management that made significant contributions to its effectiveness in the other two "success" factors.

To take another case, an airline, seeing the competitive advantage of its route system diluted by CAB policy, decided to concentrate on passenger service. As a consequence, it emphasized reservations and space control as its most promising use of EDP, and today has a largely automated, efficient system in operation.

In reviewing the appropriateness of applications, then, the EDP audit determines how applications have been selected in the past, what criteria should be used in making future choices, and finally how successful the company has been in picking applications that have provided the greatest opportunity for making a contribution to the company's competitiveness or profitability.

Success of Applications

The next question is how well the company has done with the applications it has selected. Success can be measured in many ways, but the criterion that really counts is the extent to which the various departments that are "customers" of the computer are satisfied with results. To determine this, it is usually necessary to conduct a series of interviews with department heads and their subordinates, front-line supervisors (where they may be affected by the computer's applications), and even customers, distributors, or suppliers. The interviews will provide answers to such questions as these:

- Are computer-produced reports on schedule?
- Are customers' orders filled more quickly?
- Are purchase orders to suppliers more stable and less subject to "emergency" revisions?
- Have inventory levels actually been reduced without adversely increasing stock outages?

(Continued on page 73)



NOW—THE AGE OF

Massive Engineering

By Paul O. Gaddis

Condensed from Harvard Business Review

WE ARE NO LONGER in the Age of Mass Production; rather, we are in the Age of Massive Engineering. New knowledge is being massively used to solve new problems in all fields.

In some industries (like those which deal with missiles and other space products), millions of dollars have been devoted to systems where production costs are a relatively small percentage of the total. An example is the Navaho guided missile project. After this mammoth project was cancelled in 1957, there were allegations of waste and indecision. But the cost of gaining sufficient knowledge even to make this decision constituted a large part of the \$650 million spent on the program. And even

though production of actual missiles was small, the knowledge that was obtained can be considered a commodity to be inventoried and used in succeeding projects.

In many companies, no matter what their products, the portion of "direct labor" cost has been dropping steadily, until it is now estimated to hover around 50 per cent. Conversely, the ranks of "indirect labor",—where new knowledge is being cultivated, categorized, and applied to corporate problems at an increasing tempo—have been swelling.

This raises a basic question for management: How will it cope with the increasing problems of massive engineering? No answers are yet

Harvard Business Review (January-February, 1961), © 1960 by the President and Fellows of Harvard College.

available. But we can delineate the problem areas that require new approaches:

1. *We must systematize management knowledge, to complete the transformation of management from an art to a disciplined profession.* Present-day management, in its resourceful and pragmatic approach to its problems, is coming up with good solutions some of the time—and often without knowing why. Until we know how adequate decisions are made, the ability to transfer our management knowledge will remain limited.

Appraising Creativity

2. *We must learn how to appraise the productivity of those who work with new knowledge, those who use applied creativity.* How can we identify this creativity? How can we judge its relation to corporate profitability? What is the minimum return we must make on applied creativity to cover us against future risks?

3. *We must properly assess the role of research and development.* R&D expenditures now amount to about 4 per cent of the national income. How do we relate R&D to profitability? What is its proper place in our corporate organization? How do we evaluate performance? As R&D expenditures continue to grow and forced product obsolescence becomes the order of the day, new plant requirements will arise faster than ever before. How will this affect traditional policies and practices on capital investment?

4. *Classic theories about "line-staff relationships" are no longer*

significant. They are worse than insignificant—in many cases they are misleading and damaging. We need a new understanding of organizational authority and accountability. The important first step is to throw out the words "line" and "staff" and replace them with a meaningful terminology.

5. *Problems are plentiful in the areas of design, development, construction, and testing of large, complex physical systems.* These problems include: How do we reduce the extreme "penalty of error" for any mistake during the design phase? How do we predict professional output well enough so that we can better estimate production schedules? How can we accurately estimate costs for these large systems? How should we allocate money, men, and materials within a system effort?

International Implications

6. *International trading will be influenced by massive engineering.* U. S. industry may soon cease exporting large volumes of simple products. Instead, we may export increasing volumes of advanced products and services, including technological know-how, where profits will involve licenses and royalties. Thus the manager concerned with international trade must learn to harness massive engineering to serve his objectives.

7. *Markets will be determined increasingly by new products.* How should management guide new-product development? How can management predict the marketability of new products? This becomes a tougher problem as the customer finds himself less able to understand

the capacities of our company laboratories and to relate laboratory output to his own needs.

8. *Mammoth projects, made feasible by massive engineering, will call for new forms of corporate cooperation.* How will groups of companies work together on common projects? What is the true nature of the business-government operating team? What kind of economic team will best accomplish giant public service tasks like ridding a city of the curtain of heat and polluted air which surrounds it? Here, the crucial problem for management is to preserve, in a positive manner, the role of private enterprise.

Living with Innovation

9. *Since we are going to live with innovation in our enterprises, we should find out more about it.* What corporate conditions breed innovation? How can we stimulate the initiative of the small technological enterprise, yet still employ, on our large tasks, the total resources of our large corporations?

10. *Last, but perhaps most complex, is the question of how best to organize for massive innovation.* How can we fit complex new products and processes, involving vast capital costs and vast potential markets, into existing corporate structures? How can we make these structures flexible and dynamic enough to provide for a large-scale, forced product turnover? How can we build a manager corps that will function amid constant change?

These are specific problems of major importance. Each problem can be solved if we can maintain equilib-

rium in our approach to one fundamental problem: the maintenance of individualism. Industry is still populated with human beings—including those who apply knowledge, the professional technologists—and always will be. Management must beware of misguided attempts to apply quantification in the areas where massive engineering is practiced. In some organizations, efforts are being made to break down professional work functions into their elementary components, to quantify these components, and then to resynthesize them into improved performance patterns or "standards." If these practices are misunderstood or misapplied, they could cause havoc: Human technological work would be measured and controlled as a series of hyperspecialized, repetitive, machine-like functions of minimum challenge. The result would be general frustration, probably without the expected increases in productivity. Our technologists would become only doers, never planners, of their own work, and would thereby become unable to adapt to rapid industrial change. In the modern industrial scene, a technological group that cannot adapt to change is a dubious asset.

Judgment and Integrity

But if we reject the doctrine that true professional work can be quantified at this stage, then we must provide a substitute. And the only substitute for pseudo-measurement is human judgment—coupled with integrity. Management must recognize the responsibility of judgment as a large one, and be ready to assume it fully. ♦

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Top Management Faces the Cost Challenge

By Jack J. Friedman

Condensed from Dun's Review and Modern Industry

PRODDED by sagging profits last year—and uncertainty about profits in 1961—corporations across the land are getting rid of unproductive overhead and trimming off dead weight. Formal cost-cutting seems to be the order of the day, but industry clearly is not panicking. Most cost-cutting programs bear the mark of careful planning and review, and the recklessness that marred similar efforts of some companies during 1957-58 is absent.

That is the picture that emerges from a recent *Dun's Review* survey of the presidents of 200 leading corporations. According to the study, formal cost reduction will play a more important role in corporate activities during the next twelve months than it has in the past. Two-thirds of the surveyed companies have already launched or are planning to launch formal programs, as distinct from their continuing review and controls. This is 4 per cent more, among the same group, than adopted such programs during the 1957-58 recession, and the number may well grow.

Broad philosophies regarding cost reduction are slowly taking shape. Of the respondents, almost 40 per cent say they are guided by certain basic principles. Here are four of the most important:

Look to the Long Run

- The lasting significance of any cost reduction must be given priority over immediate, dramatic, short-term effects. President Henry C. Estabrook of Sealright-Oswego Falls Corp., Fulton, N. Y., sums it up this way: "We must keep in mind what the long-range effect (over a five-year period, for instance) will be on the company. The tendency is to think of the immediate situation, with not enough thought of the future."

- Top management must supervise all cost-reduction efforts. This means involvement all along the route, not cost-cutting by remote control or front-office edict. As President J. A. Keller of Mergenthaler Linotype Company, Brooklyn, N. Y., says: "Top management must lead and make personal sacrifices to establish tone. Fol-

Dun's Review and Modern Industry (January, 1961), © 1961 by Dun & Bradstreet Publications Corporation.

low-up and continuing attention to results are mandatory."

- Cost-cutting must be accompanied by a continuing communications effort aimed at maintaining employee morale and productivity. Edward A. Purnell, president of the General Fireproofing Company, Youngstown, Ohio, says: "Proper communications are imperative to produce an understanding of the company's competitive position and problems."

- A continuing cost-control program in good times as well as bad is better than cyclical blood-letting and often obviates the need for formal cost-cutting in hard times. As President Frank Armour, Jr., of H. J. Heinz Company, Pittsburgh, says: "Cost should be continuously approached with severity. There is no in-between action in a vigorous business that is planning for the future."

The Changing Picture

To some, formal cost-cutting may suggest a workforce riddled by layoffs, a staff emasculated by across-the-board dismissals, or demoralized executives making do on sharply reduced salaries. But this picture, whatever its validity in the past, is clearly on its way to extinction.

Except when real disaster looms, 88 per cent of the respondents reject general salary reductions as a way to cut costs, and 66 per cent turn thumbs down on wholesale cutbacks in staff. Both, they say, can do the company permanent harm. H. G. Ebdon, president of Combustion Engineering, Inc., New York City, labels across-the-board reductions in personnel "an indication of executive weakness." But Joseph S. Young, president of

Lehigh Portland Cement Company, Allentown, Pa., points out that a company may be better off getting rid of less productive employees and paying more to the efficient ones who are left.

Battle of the Bulge

To the critical eye of some 39 per cent of the respondents, the production department is the biggest bulge in the corporate silhouette, with sales—cited by 19 per cent—the runner-up. Other flabby spots are administration and staff (cited by 11 per cent), advertising (11 per cent), and research (8 per cent). A number of companies, however, insist that no single area yields dramatic results to the cost cutter. One New York manufacturer says, "The fat must be rendered from each and every department. Unfortunately, all areas are equally affected by laxity in holding back costs."

In periods of crisis, even companies with continuing review programs are likely to put on a bit more pressure—and when they do, they beef up their communications efforts as well. Bulletin boards and house magazines burst with exhortations to boost productivity, pull up the slack, and get the shoulder to the wheel. Contests and rallies inevitably follow.

How effective are these traditional communications gestures? Not very, in the opinion of a good many companies. William B. Prosser, chief executive of Perfect Circle Corp., Hagerstown, Ind., holds that "the problems of cost-reduction must be translated into specific areas of responsibility with definite objectives, in order to achieve the best results."

And in setting those specific areas, a number of companies have found it effective to keep cost-cutting committees to a minimum, while assigning the responsibility for achieving established goals to company officers.

Where Not to Cut

To a large degree, opinion has crystallized as to what cuts should not be made. Some 38 per cent of the respondents would retain management-development programs. In the words of Samuel F. Hinkle, president of Hershey Chocolate Corp., Hershey, Pa., "Curtailling them would be a business diet leading to starvation." Another 34 per cent of the presidents nominate research and development for virtual cost-cutting immunity. They agree with one president who declares that it is folly to make such programs "cost-reduction whipping boys—they represent the

earnings of the future." Approximately 26 per cent reject any cuts in advertising.

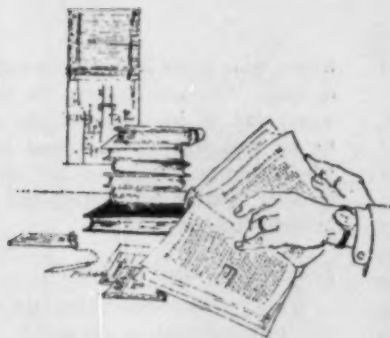
What happens to formal cost-cutting programs over the long run? On the basis of their past experience, almost 90 per cent of the respondents agree with this observation by the president of a Pennsylvania company: "The incentives for careful policing begin to erode when the pinch eases. Cost-cutting programs must be closely policed to be effective." The head of a New Jersey firm points wryly to human nature, noting: "Prosperity always seems to add fat. Expenses which were once considered *desirable* suddenly become *essential*." One president, however, insists some loss of ground must be permitted, since constant heavy pressure to cut costs "puts management in the position of the 'boy who cried wolf.'"

A Slice of Status

PHEASANT AND CAVIAR are by no means the only foods with symbolic value for status-seekers. William F. Whyte, in his book, *Human Relations in the Restaurant Industry* (McGraw-Hill Book Company, Inc.), reports that different kinds of food have different status values. Researchers discovered that the preparation of fish ranked lower than the preparation of chicken or meat. White meat had a higher status than dark meat. Working with odds and ends was rated lower than working with large slices.

Vegetables also had varying status values. The tops in the vegetable field were luxury or decorative items such as parsley, chives, and celery. Next came green beans, then spinach and carrots. After white potatoes came onions, which occupied the bottom of the scale. One worker made it quite clear to researchers that she did not usually peel onions.

The fish station in one restaurant presented an interesting status problem during World War II. The working supervisor, Gertrude, was a skilled and valuable employee in the kitchen. The importance of her work was enhanced by the wartime meat shortage. But in spite of this, her position occupied the bottom of the status hierarchy because of the attitude that the employees had toward fish.



"Information Scientists"— *Industry's Link with Outside Research*

By Ted Stanton

Condensed from The Wall Street Journal

IN 1960, enough technical papers were produced by the world's laboratories and research centers to fill 60 million pages—the equivalent of 465 man-years of around-the-clock reading.

Hidden away in this mountain of literature are thousands of ideas for new products and cost-saving processes of all sorts. And the mountain is growing larger each year. Industry's problem: to keep up with it. The laboratory scientist, busy with work of his own, no longer can find enough hours in the day to keep abreast of all that is published in his field. Even staying on top of the indexes and abstracts of these papers has become an insurmountable task. One

result is that company after company has found itself duplicating research work that others already have done and fully chronicled.

A New Profession

The solution being tried by an increasing number of the larger corporations is to free some of their experienced research and development men completely from laboratory or bench chores and to put them full time to reading. As "information scientists," these men keep project teams abreast of the latest competitive developments in their research areas, help them avoid duplication of past work, and suggest new projects for investigation.

A valuable aid has been the devel-

The Wall Street Journal (December 20, 1960), © 1960 by Dow Jones & Company, Inc.

opment of elaborate mechanical and electronic systems for filing and retrieving scientific information. But, as Henry C. Longnecker, manager of the science information department of Smith Kline & French Laboratories, says, "Just having the information available is not enough. Maintaining our competitive position requires the proper and timely use of the information by trained men." Smith Kline & French maintains a special staff of 15 information specialists who participate as advisers and co-planners in each R&D project the company undertakes. DuPont, Merck & Co., the Convair division of General Dynamics Corp., and Lockheed Aircraft Corp. are others with formal information programs aimed at aiding the bench scientist and keeping him from being buried under the flood of scientific literature.

An Ambitious Program

One of the most ambitious of these ventures is being carried on by Esso Research & Engineering Co., a unit of Standard Oil Co. (New Jersey). Esso's program is centered in a Technical Information division, staffed by fifty men and costing more than \$1 million a year. At the core of the division are 15 senior scientists, all Ph.D.'s and all with several years' prior experience in various Esso research projects, both as team members and as directors of project teams. These men are supported by a group of junior scientists and library technicians who investigate background literature for specific projects and prepare reports and abstracts.

"Our prime job is to stimulate the men on the bench," says William T.

Knox, who heads Esso's information division. "We don't relieve the technical man of his responsibility; we try to help him use his time most efficiently, by acting as an intermediary between his problem and the available information."

Saving Time and Money

What prodded Jersey Standard into full-time information research? According to Mr. Knox, an internal survey in 1956 revealed a surprising feeling of inadequacy on the part of the company's scientific personnel. Most of the research men believed they weren't sufficiently up-to-date in their own fields, had insufficient opportunity to benefit from possible "cross-fertilization" from other fields, and weren't even adequately informed of past or current work within the company itself. When management heard this, it acted quickly.

Savings were not long in showing up. One technical monograph from Sweden, coming to an information researcher's hand, saved an Esso laboratory in Tulsa a month-long exploratory program, budgeted at thousands of dollars. In another case, more than 100 chemical compounds scheduled for examination were swept from test schedules after a literature review by a researcher revealed that similar test work had been done by others.

The division has initiated important projects, too. Recently, an information researcher was searching through the literature for an answer to the problem of settling refinery dust. In reading the various ways in which heavy petroleum residues like asphalt have been used for settling dust on

roads, he suddenly had what Mr. Knox calls "a happy flash." As a result, Esso is now promoting a petroleum mulch to protect the roots of newly planted grass and farm crops from wind erosion and loss of moisture.

To see how the Esso program works, follow the path of one piece of information that came into the division's office recently. It was a 20-page paper given at a chemists' meeting in Texas. Mr. Knox read it through and found on the last page a casual one-sentence reference to a new catalyst. He passed it along to Dr. Isidor Kirshenbaum, one of his research men, with an "Are we interested?" note attached.

"I turned it over in my mind a couple of hours and finally came up with a possible application," Dr. Kirshenbaum says. "Then I talked with the head of one of Esso's laboratory teams and broached my catalyst. He thought it was at least worth a look." Whether it will pan out may take months or even years to determine, "but at least it didn't get by us," Mr. Knox observes.

Playing a vital role in many corporate information research programs is

information retrieval. Esso estimates it has over 1.5 million file cards on all types of technical literature stored away, as well as about 75,000 feet of microfilm. Mr. Knox is looking forward eagerly to the time—a few years from now, he believes—when machines to scan and translate foreign technical works will be in common use. "The machines appear to be the best solution to the growing body of foreign language publications," he says. It's estimated that more than one third of all technical and scientific publications are now printed in Russian, Chinese, or Japanese—languages in which only 2 to 5 per cent of United States scientists are at home.

Dr. J. P. Nash, director of research for Lockheed's Missiles & Space division, cites one difficulty with translations. One of his men got word that a Russian technical journal had printed a lengthy paper dealing with the specialty he was working on. For weeks the Lockheed scientist waited for a translation to be made by an outside agency. When the document finally arrived, it was a retranslation of a paper the scientist himself had given many months earlier. ♦

Communications: How Much Gets Through?

WHEN TOP MANAGEMENT TALKS, how well does it communicate? Not very, according to a study of 100 companies made by the Savage-Lewis Corp., Minneapolis, reports *The Iron Age*.

Here's what the survey showed: Vice presidents understand only 67 per cent of the message from the board of directors or top management. At the level of general manager, the amount of the same information surviving is down to 56 per cent.

As it reaches the plant manager, the level drops to 40 per cent. Among foremen, it dips to 30 per cent, and finally, among workers, the rate of understanding is 20 per cent.

How to Bid Smarter

A COMPANY bidding on defense contracts can be well informed on the mechanics of bidding, what contracts are available, and what's required if it wins—but may still wind up with a profitless contract. So believes Harry B. Rottiers, director of defense contracts, Burroughs Corp., Detroit. These eight points, suggested by Mr. Rottiers in *Steel*, may help you to bid smarter:

- *Is the contract in your area of interest?* Most firms are better off bidding for jobs that are closely allied to their commercial operations. They'll be more skilled—and may be able to develop techniques or information that will benefit their nondefense activities.

- *What type of contract is it?* A fixed-price contract may be too risky for R&D. Fixed-price plus incentive may be better than a redeterminable contract for production work. Cost-plus contracts usually imply less direct profit but may result in additional contracts or less tangible profits in the form of technical or production knowhow. Government technical advisors and inspectors can be helpful to any firm.

- *What is the program's status?* Is the project in an early-study phase, or has equipment already been designed—perhaps by a competitor? Have some units been produced? Generally speaking, the further advanced a program is, the more difficult it is to complete it successfully.

- *Will you have to expand?* Are your present facilities and manpower adequate? Will you have to spend working capital to renovate or reopen facilities? Will you have to pull trained personnel away from other jobs? If so, for how long?

- *Who's your competition?* Prior bids, Department of Defense briefings, symposiums, trade literature, and association meetings can help you spot and evaluate potential competitors. Do they have prior experience in the field? What production, technical, and manpower skills and facilities do they have in the contract area?

- *How do you select the team?* Your firm may be acting as customer, vendor, teammate, and competitor to another firm. What are this other firm's accomplishments, competitive position, and reputation? Should you go prime, or aim at an associate or subcontract agreement? How do your company's personnel (from top management down) get along with potential teammates? How much information would you have to share with a firm that's a close competitor in your commercial business?

- *What are the contract price and terms?* How much time and money will be spent in formulating the bid? How long will key personnel be tied up? How much initial research is needed before you bid? How do you plan to recover the costs?

- *Have you checked on clauses covering patent and data rights?* How about payment-withholding clauses? Should you press for a redetermination clause on fixed-price contracts? Can you get indemnity coverage if you need it?

new techniques for

short-run production

By Leslie D. Gottlieb

*Condensed from
Industrial Design*

IN AN ECONOMY geared to mass production, one of the most formidable problems for the industrial designer is how to keep costs down on products that are *not* mass produced.

Short-run production methods are used widely. Manufacturers often use them to prepare product models for design and engineering evaluation.

Industrial Design (January, 1961), © 1961 by Whitney Publications, Inc.

Short-run methods are used to produce models for market testing: The relatively low cost of these techniques allows a manufacturer to put his product on the market without risking heavy investment in tooling. Another advantage is speed of delivery of short-run components. For example, a wood pattern used in sand casting can be made in a matter of days, but steel dies, which often must be machined, may take months for delivery.

Limited Selection

The industrial designer planning for short-run production is challenged not only by a limited selection of tool-

ing methods but also by limited design capabilities within each method. Some methods can't handle complexity of shape; others result in poor surface finish; and almost all low-cost tooling methods have lower dimensional tolerances and cannot accommodate special features. But good product design is no less imperative with short runs than it is with mass runs, and the designer must find ways to overcome these limitations.

Plastic Dies

Several recent developments in tooling make it possible to use forming methods that were once taboo for short runs. For the most part, the new developments hinge on substituting, for metal dies, easier-to-work and cheaper epoxy plastic dies. The aircraft and automobile industries spearheaded the use of plastics for dies in the late 1940's. Today, they are found in most fabricating industries. The metal-forming industry employs epoxies for stretch dies, draw dies, flexible forming dies, drop hammer dies, foundry tools, and hand hammer forms. The plastics-forming industry uses them for vacuum-forming patterns, foam-forming patterns, matched dies for low-pressure molding and, most recently, for temporary dies for injection molding.

Epoxy tools, which are constructed either by casting or laminating, have many advantages. They cut costs—in some cases, by a spectacular 80 per cent. They reduce lead time to a matter of days. They eliminate finishing, since the plastic accurately reproduces the finish of the model against which it is cast or laminated. They obviate matching and trimming

of dies, because they are made from a single model, whereas model dies are machined from separate metal blocks. They facilitate quick design changes, since they can be revised by recasting, resurfacing, or chipping off (or adding more) plastic. They handle well because they are lightweight (one-fifth the weight of steel). And they store easily because they do not rust or corrode.

Very large tools sometimes call for a combination of casting and laminating. They may have a cast core to reduce costs and a laminated surface for high shear strength on the corners. For other tooling applications, epoxies may be combined with other materials: metal cores to increase compressive strength; metal inserts to pierce and shear; foam cores to reduce weight and cost; and various other fillers to boost resiliency and abrasion resistance.

Newest Techniques

The newest plastic tooling techniques include spraying a metal surface over a plastic backing to increase strength (Marblette Corp., Long Island City, N.Y.); spraying metal fibers to serve as a mechanical bond between epoxy and plaster (U.S. Gypsum Corp., Chicago); pattern-making with flexible silicone rubber molds (Dow Corning Corp., Midland, Mich.); using transparent epoxies that can be tinted any shade or color for casting knobs, lenses, and other transparent items that previously had to be machined or carved (Marblette Corp.); and modeling with special plastic formulations that replace mahogany (Ren Plastics, Inc., Lansing, Mich.).

Besides plastic tooling, several other recent money-saving tooling developments have a special interest for designers. The Barber-Colman Company, Rockford, Ill., has perfected a process for forming complex, odd-shaped enclosures in one piece; previously these could only be hand fabricated. The process, known as Polyforming, has already been used to form a temperature control box for the Titan missile system. Hand fabricating the box costs \$100 each in lots of five, and \$50 each in 1,000-piece lots; Polyforming reduced the cost to \$45 each in lots of five, and \$9 each in 1,000-piece lots.

The Dayton-Rogers Manufacturing Company, Minneapolis, Minn., produces extremely thin (up to .020 inch) metal shapes by photographic etching procedures. The company claims their process averages cost savings of 80 to 90 per cent over conventional tooling. All types of intricate shapes can be made to close tolerances, free of burns, and completely flat.

Lighter Steel Dies

Templet Industries, Inc., Brooklyn, N. Y., has a process for making lighter, less bulky steel rule dies for piercing and blanking sheet metal. The cutting edges, made from hardened steel, are braced with specially hardened and moisture-resisting plywood. The dies can be used with any stampable material, and Templet claims they can be constructed for about 10 per cent of the cost of standard all-steel dies. The company licenses the process to many major industrial firms, including RCA, Bendix, International Harvester, A. B. Dick, Gen-

eral Electric, and Pratt & Whitney. In one of its applications—for ACF Industries—only ten tool hours were required to produce a die to blank a one-half-inch hot-rolled steel shape for a railroad coupler part. Die material cost was comparably low, suggesting that designers might use these dies for experimental production.

Short-Run Tooling in the Future

It is difficult to forecast improvements in short-run production techniques. However, there is strong evidence that tape-controlled "robot" equipment will eventually permit presently expensive machining operations to become short-run operations. While the cost of the equipment is still very high (running over \$150,000 for Kearney & Trecker's Milwaukee-Matic Model II combination production unit), its increased productivity and its ability to machine small numbers of parts with very little set-up time and without expensive labor costs are already finding favor with manufacturers. Republic Aviation Company, which uses tape-controlled machine tools, regards them as the only practical means of reducing machining time, tooling costs, and lead time for the great number of machined parts that they require. In their initial operations, they find that the cost of programing the tapes is 54 per cent less than the costs of fabricating models. Machining is reduced 60 to 85 per cent, and the costs of tool storage and handling are reduced 85 per cent. When the savings these figures represent are added together, only the initial price of the tape-controlled machines can be called expensive. ♦



Preview of 1961's Stockholder Meetings

By Elizabeth M. Fowler

Condensed from *The New York Times*

THE SEASON IN THE SUN for stockholders—annual meeting time—is approaching fast. In March, April, and May a multitude of corporate managements will either bask in stockholder approval or engage in heated questioning. This year there may be more heated meetings than usual because of the downtrend in earnings, conflict-of-interest disclosures, and a rash of proxy fights.

As usual, the meetings will run the gamut in size and length of time. The American Telephone and Telegraph Company regularly draws the largest crowds—11,200 in 1960—and the meeting lasts several hours. In other firms, few if any stockhold-

ers show up, and the annual meeting usually takes about five minutes.

This year will see more companies moving the sites of their meetings. For the first time in history, AT&T will hold its conclave in Chicago, and Standard Oil Company (New Jersey) will go to Boston. IT&T plans to meet in San Francisco for the first time. Meanwhile, a denizen of the West Coast—the Southern Pacific Company—will continue to use Wilmington, Del., as a meeting place.

Some companies act as if they didn't want stockholders around; others give stockholders all kinds of inducements. General Electric Company invites them to Schenectady and

The New York Times (February 5, 1961). © 1961, by *The New York Times Company*.

takes them on a plant tour. Continental Can Company serves a sit-down hot lunch in New York. CIT Financial has just mailed stockholders a calendar with the date of the annual meeting marked in color.

The Chesapeake and Ohio Railroad probably does the most. Besides holding the meetings in different places (this year's is scheduled for the Greenbrier Hotel in White Sulphur Springs, W. Va.), it rushes special trains and serves lunches with such succulents as fresh strawberries and pecan pie. Jacob Ruppert, Inc., provides all the beer the stockholders can drink, a buffet lunch, and a lively meeting.

Another increasingly popular technique for adding stockholder participation is the use of closed-circuit television. American Machine and Foundry Company used closed-circuit TV in 1957 to link shareowners and management in New York and Chicago. In 1959, General Mills Company used a coast-to-coast hook-up of seven cities, set up by Theatre Network Television, Inc., so that stockholders in all these areas could ask questions and receive answers.

Meetings range, of course, from the rowdy to the dowdy. This year, chances are that most meetings will last longer, that more stockholders will attend, that the questions will be more pertinent, and that the state of the nation's morality, of the economy, and of the world may be topics. Stockholders will be most interested in dividends, sales, earnings trends, and what management is doing to keep the earnings ratio up in the face of cost rises. Foreign operations will be a matter for discussion in meetings of many companies, including International Harvester, Coca-Cola, and American Cyanamid. Because of lower production costs abroad and the European Common Market tariff system, more and more U. S. companies have been increasing operations in Europe. Companies with Cuban affiliates, like American and Foreign Power and American Sugar Company, face questions on the extent of losses there.

Merger intentions, bonuses, stock options, stock dividends versus cash, and post-meeting reports are other subjects sure to provoke questions among stockholders this year. ♦

On-the-Spot News from the Bargaining Table

"GET IT WHILE IT'S HOT" doesn't refer to coffee but to news at B. F. Goodrich Company (Akron, Ohio). In bargaining sessions with the union, reports *Factory*, management installs a top-notch communications man at the bargaining table. Now letters to employees, memos to supervisors, press releases, etc., are prepared on the spot jointly with company negotiators. This way, there's little chance of misinterpreting or releasing too little or too much information.

After each day's session, a factual report is put out giving both the union and management's stand on issues reviewed that day. Management employees at each Goodrich plant involved get a copy of this report the same evening.

Office Mechanization:

Is this machine necessary?

By Bess Ritter

Condensed from Office Management and American Business

A NEW OFFICE MACHINE can be the best investment you've made—or it can represent dollars down the drain. It can help you handle more work with greater accuracy and speed—or it can complicate what used to be a simple operation. It can help you reduce costly overtime and unnecessary salaries—but at the same time it can add hidden costs that you had overlooked.

Factors to Consider

Successful office mechanization does not automatically follow the purchase of new office equipment. That is why these six factors should be considered while the purchase is still in the planning stage:

1. *Does the office really need the equipment?* If you need better business control, efficient check-protecting and signing machines can be valuable. If you must improve the appearance of finished work, then up-to-date typewriters, multigraphing, and mimeographing machines, as replacements for inefficient and outdated ones, can help.

But if the machine is not really necessary, it may waste money in-

stead of saving it. For example, one office supervisor was entranced by a marvelous automatic labeling machine. It could apply more than 14,000 labels per hour to post cards, insertion cards, pamphlets, brochures, all sizes of envelopes, lightweight booklets, magazines, and catalogues. These labels could be gummed or ungummed, roll strip, continuous pack, or even cut—and it was a real buy at its price. But since the office handled no more than approximately 10,000 labeling operations a week—and these for only one type of lightweight booklet—the final office decision went against the purchase because the firm would be paying for features that it would never use.

The Right Model

2. *Have you selected the most suitable model?* One office needed a paper-cutting machine that could handle papers of various thicknesses and could be used by anyone on the staff. A suitable model was selected, which featured a full-width, adjustable back gauge, a heavy-duty paper press, an automatic safety device, and

Office Management and American Business (February, 1961), © 1961 by Andrew Geyer-McAllister, Inc.

nickel-plated operating parts. It could cut thicknesses up to a full two-and-a-half inches. However, since the firm was undergoing an economy drive, it purchased a cheaper model that could handle only two or three sheets at once. It was eventually discarded—at a loss—and replaced with the model originally selected.

Another consideration is whether you need a machine that can combine several functions into one operation. If the office requires a simple photographic-type copying machine designed to handle general copy work, investment in something more versatile may be unwise. But if many kinds of essential documents are now being copied slowly—and expensively—by hand, then a costly, yet efficient, copying machine that is able to transcribe all these documents quickly may actually bring the cost of this paperwork down.

The Real Cost

3. *Do you know the true cost of the machine?* A machine's savings to an office cannot be determined until its true cost is known. That is why it is important to investigate "hidden" costs like these:

- Installation (if any, since the price of many large office machines includes installation charges).

- Labor required for operation. Are special skills required to operate the machine, and, if so, can present employees be trained? What will this expense add up to? If new employees must be hired, how much do you have to pay for this work?

- Any special forms and supplies that are required for the use of the machines.

- Depreciation (or rental costs).
- Additional light or power. When many electric typewriters replace manual machines, you are bound to have additional power costs, plus the expense of adding additional power lines.

Saving Time

4. *Will the machine save labor time?* To determine this, clock one hour's performance of doing the work manually. Then clock one hour's performance of doing it by machine. With items like photocopying machines, results can be so dramatic that you can actually plan to reduce office help. But when machines require preparation before they are used, plus dressing down after they are used (like mimeographing machines, which must be inked before use and cleaned up afterward), be sure to add the time required and the labor cost of this time.

Ask these questions, too: Will the use of the machine require additional perpetual supervisory time? Will you have to maintain two systems while the new method is being installed? If so, for how long?

5. *Will the new machines help raise the morale of the employees who will use them?* Here's one way they can: Allow the employee to select the model or color of her machine, where this is feasible. One company decided to replace 100 ten-year-old typewriters in its central typing department with brand new ones. The three top typists were invited to select the brand of typewriter. After the selection, each girl in the department was able to choose the color for her own machine.

Another way to raise morale is to introduce the equipment beforehand to the employees who will use it. One firm, for example, planned to install a new record storage device after seeing its performance in a local business show. The file clerks who were going to use it were given tickets to the show, where they could see the equipment in operation. When they saw how it would reduce fatigue and cut down the monotony of a repetitive operation, they were "pre-sold" on the equipment.

Employees Share Savings

Still another method is to share operational savings with the employees involved. When a photocopying device reduced an office secretary's

work by an average of two hours a day, her company cut her usual eight-hour day to seven-and-a-half. Another firm—recognizing that transcription machine operators earned approximately 15 per cent more per week than typists in that particular area—gave typists who did part-time transcription work a 15 per cent higher hourly wage when they were operating transcription machines.

6. *Will the company be able to recoup the cost of the machine—via time and work saved—within a reasonable period of time?* According to a rule-of-thumb suggested by the Small Business Administration, this should be accomplished within one-fourth of the estimated life of the machine. ♦

Production Workers Get Out and Sell

PRODUCTION AND LINE WORKERS double as company salesmen at Fort Wayne Metals, Fort Wayne, Ind., manufacturers of stainless alloy wire, reports *Industrial Relations News*. The practice of shifting production workers to sales work every sixth week, says the company, "creates an enormous amount of pride and responsibility among our personnel." Within six months of the program's inception in 1957, sales rose 26 per cent; they leaped another 77 per cent from 1958 to 1959. Production rejection rates dropped to only 3 pounds for 10,000 shipped ("an industry low"), and absenteeism tumbled.

The program was inaugurated by the company (42 employees, annual sales over \$1 million), because it could not afford an independent sales staff. President Ardell Glaze turned to the company's skilled craftsmen because they understood production costs and schedules and could talk knowledgeably about tolerances they personally measure.

Work schedules are tailored so only one man is gone at a time. His in-plant duties are assumed by other personnel during his absence. The sales program is strictly voluntary. Salesmen are recruited only from personnel with an active interest in selling.

None of these salesmen receives additional pay (except for normal, on-the-road expenses). The production-workers-turned-salesmen consider the opportunity to travel, broaden their backgrounds, and meet other men in the industry as additional compensation. Customers, says Glaze, appreciate talking to the man who draws the wire or the technician who approves each product shipment.

HOW *Air Freight*

IS PAYING OFF



By Wolfgang Langewiesche
Condensed from The Reader's Digest

A**IR FREIGHT** has become increasingly important to manufacturers for one big reason: It pays. A company in Michigan, for example, makes a cheese that sells well among U.S. families with a Ukrainian background. But the cheese stays good only eight days, and the only market it could reach by truck was Detroit. In other cities, after the long truck trip, the remaining shelf life of the cheese was too short, and grocers didn't want to bother stocking it. The market now extends to most of the Middle West—thanks to air freight.

Time Is Money

Time is money in a different way for a distributor of pharmaceuticals in Mexico City. The distributor—with limited working capital—buys

its drugs from a supplier in Fort Worth. As soon as the supplier sends out a shipment, it also forwards its bill, which is payable in 30 days. By truck, with customs delays, the shipment used to take many days to reach Mexico City. Now, with air freight, the distributor has a few extra days in which to sell the pharmaceuticals. It can now sell most of each shipment—and collect for about half of it—before the supplier's bill falls due.

Less Packing

Air freight has another advantage: It requires less packing. This helps it compete against the cargo steamer, for the packing of sea freight is especially expensive. Ocean-going goods must be protected against rough handling, against the weight of other merchandise piled on top of them, and against rust and rats. The

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crating of a delicate machine may cost several hundred dollars.

Air freight eliminates much of this. Ninety per cent of the spare parts for Renault cars now go from France to America by air freight in ordinary cartons on regularly scheduled cargo flights. On every \$100,000 worth of parts shipped, Renault pays \$8,500 more than for surface freight. But it saves a total of \$8,600 on crating in France, unpacking in America, pilferage, denting, trucking, warehousing, and interest.

Saving Interest

Interest is a major factor behind the rise of air freight. An automobile fender in mid-Atlantic has money tied up in it, and this costs interest. If a company has a million dollars worth of product in transit on ships and trains and in warehouses, the interest on it may cost from \$50,000 to \$100,000 a year. By moving products faster, the company ties up less money.

The fender also ties up money when it's on the dealer's shelf. Not until it's sold does he get his money back. But when the fender spends less time traveling, the dealer can work with smaller stocks. For example, a Latin American dealer for a U. S. car used to be four weeks from Detroit by ship and train. Customers couldn't wait that long for spare parts, so the dealer had to stock parts for every year's model of the car. Many parts would never be sold, which added enormously to his costs. Now, with air freight, he does not have to stock the parts less likely to be requested; he can always have them flown in.

The same procedure saves money for many manufacturers. Raytheon, for example, used to have \$2 million in parts and components tied up in warehouses all over the country. The company changed to one-warehouse, one-day delivery by air. Distributors' orders now come by wire directly into an electronic device that handles all the paperwork. The distributor has the goods 48 hours after he places the order. Air shipment has doubled Raytheon's annual freight bill, but on the cost of warehouses, warehouse operations, interest on stored merchandise, and taxes, the net saving is \$360,000 a year.

Directional Rates

Some companies have been able to take advantage of the airlines' "directional" rates: The cargo goes cheaper in one direction than in another. For example, air cargo moves automobiles, machines, drugs, and electrical goods from the U. S. to Central America. But not enough comes back to make return loads profitable for the airlines. To promote use of the planes, therefore, the rates are cheaper homeward bound. At such rates, some companies are moving beef and powdered coffee by air from the Central American highlands to the United States.

New Cargo Planes

Soon the airlines will begin hauling freight at half the present rates. All they need is an airplane designed from scratch for cargo. Up to now, almost all cargo flying has utilized converted, obsolete, passenger planes. With the door on the airplane's side, all cargo has to be moved up, in,

around a corner, and then forward. This can take six hours per stop.

Several specially designed cargo planes are already on the drawing boards. Most likely, the cargo plane of tomorrow will be a jet, maybe a cargo version of the familiar Boeing or Douglas jetliner. The front or the tail will open up so that the cargo can be run in fast in a straight-line motion. There will be new systems of cargo-handling devices to help speed loading. Cargo will travel on pallets, each about eight-by-ten feet. Several tons of cargo will be piled onto the pallets, awaiting the arrival of the

plane. When it lands, a specially designed vehicle will back up against the open tail section, offering an extension of the airplane's floor. The floor will have rails or rollers running lengthwise inside the plane, on which the pallets will ride. The whole string of pallets will be pulled out—like a miniature freight train—and those pallets destined for the stop will be removed. Those containing material to be shipped out will be linked to the line of pallets and slid back into the plane—and the whole process will be completed in the time it takes to refuel. ♦

Science's Conquests for the Sixties

WHAT WILL BE the five most important scientific breakthroughs in the decade ahead? To find out, *News Front* magazine surveyed the R&D heads of major U.S. corporations. This is a consensus of their answers:

1. *Manned space flight.* This may be the decade's first major breakthrough. Dr. Wernher von Braun, National Aeronautics and Space Administration expert, predicts that the U.S. will have a manned satellite in orbit by the end of 1961.

2. *Fusion power.* This reaction—which must be both sustained and controlled for power production—occurs at a temperature estimated at 100 million degrees Fahrenheit. No known material can contain it, but the best hope is “sealing” it from matter through some electrical and/or magnetic means.

3. *Thermoelectricity.* This is the direct conversion of heat to electricity, using, for example, heat from a nuclear reaction or the sun. The big task is to do the job at a cost competitive with existing energy production. Thermoelectric devices have already powered satellites' radios and recording instruments.

4. *Cancer cure or control.* Intensive large-scale research is already under way. Two major avenues offer hope: One is control by a drug or other chemical (chemotherapy); the other is development of a vaccine—if cancer turns out to be a virus disease, as some recent evidence indicates.

5. *Synthesis of life.* Great strides have been made in synthesizing complex protein molecules, the building blocks of living matter. Synthesis of actual viruses, which are on the borderline between the living and non-living and which share the characteristics of both, might come before 1970.

Difficulties caused by conflicts of interest have already been met and resolved by many companies. Here, from their experiences, are some ways to deal with this knotty problem...

HOW TO HANDLE *Conflicts of Interest*

By John H. Regazzi

Condensed from The Price Waterhouse Review

CORPORATE MANAGEMENT and the general public have become increasingly concerned with conflicts of interest. Part of this concern may be seen in the widespread reporting by newspapers and magazines of recent disclosures of conflict of interest, the questions asked at stockholders' meetings, and activities of the SEC, stock exchanges, and legislators in Congress. But the problem of conflicts is not a new one, and a study of past experiences in the area suggests certain approaches to the problem.

Conflicts of interest arise when a man's personal economic activities conflict with his actions as a business executive. They may arise from stock interest in suppliers, from long-term, noninterest-bearing loans, or from entertainment, gifts, or other forms of persuasion from suppliers, customers, and others dealing with the company.

The problem of conflicts of interest

is a sensitive one, and management must carefully weigh the possible solutions. Harsh rules and investigative procedures may cause irreparable damage to company morale and efficiency. Immediately instituting unnecessary procedures to uncover conflicts may be a costly venture without commensurate results. As the first step, therefore, any investigation to uncover conflicts of interest must be tailored to the particular company. Once management has determined those areas most susceptible to conflicts, it should then turn its attention to:

- *Establishing a formal company policy.* The board of directors should formalize, if possible, a policy on conflicts of interest. The policy should cover, among other things, outside interests; buying, selling, or leasing property from or to the company; serving in a management or consult-

The Price Waterhouse Review (Winter, 1960), © 1960 by Price Waterhouse & Co.

ing capacity in another company; disclosing company information; and accepting payments, entertainment, gifts, services, and other forms of persuasion.

Ways to Disseminate Policy

• *Disseminating the policy.* Once the policy has been determined, it must be disseminated. The written material should be specific enough so that officers, employees, and other interested parties can determine what kinds of interests and activities are to be avoided. There are several means of disseminating policy:

1. *Preparing an administrative policy manual.* This manual should elaborate on the board of directors' principles. It might include examples of situations considered to be conflicts and those not considered conflicts. It should contain guides for administering the policy. Imprecise phrases, like "a close relative," should be defined. In substance, the policy should be clear enough to enable each case to be judged on its own merits, within the framework of the directors' principles.

2. *Preparing departmental procedure manuals.* Departmental procedure manuals, such as those generally found in purchasing, personnel, and engineering departments, should contain more specific guides for uniformly applying company standards. For example, purchasing manuals should point out the policy on obtaining competitive bids, the need for recording the reason for buying from other than the lowest bidder, and limits of authority. Where a company has no administrative policy manual, the departmental manuals

should elaborate on the board policy.

3. *Defining limits of authority.* Limit-of-authority regulations set limits on the sums of money which may be committed by each management level. For example, the purchasing agent may be permitted to commit the company for up to \$10,000 per contract, while the department head may go up to \$25,000 and the vice president for purchasing up to \$100,000. While these regulations do not in themselves prevent conflicts of interest, they offer a positive approach by delineating authority by the importance of the contract.

Policy Letters

4. *Preparing policy letters for department heads.* The department head will usually be the first person to resolve a conflict problem, since he is the employee's immediate management representative. A letter to him should reiterate the board's policy and should emphasize his important role in making the policy an effective one.

5. *Preparing policy letters for employees.* A policy letter to employees, to be most effective, should be friendly in tone, written in simple language, short (not over a page), and signed by the president of the company. Since there will always be new employees, some arrangement must be made to notify them of the policy. Sometimes this can be done by the personnel department when the person is hired. It might be wise to reissue the policy periodically.

6. *Preparing policy letters to those who do business with the company.* These letters serve to communicate company policy to vendors and others

who might be in a position to create a conflict of interest among the company's employees.

A Chain of Command

• *Providing for administration.* Policy without some means of administering it has limited value. A chain of command should be built into the management structure so that self-disclosure of possible conflicts, brought to the attention of department heads, can be handled uniformly. Department heads should maintain written records of their decisions in all cases, and some form of record should be prepared to permit the referral of more difficult cases "upstairs" to the board of directors.

• *Providing for self-disclosure.* Disclosure of a conflict to one's superior is the simplest way—and the way used by most companies—to bring the matter to the attention of the proper officials. Adequate administrative machinery is helpful here.

With regard to directors, many businessmen serve on more than one board. There may, therefore, be a conflict of interest on specific transactions. One way of handling this possibility is to ask each director to make available to the others a list of his affiliations and outside interests. If the board is aware of the director's business interests—and assuming that holding these interests is in line with company policy—further steps are usually unnecessary.

• *Providing for management checks.* Management checks—to see if employees are adhering to policy—may take four forms:

1. A review of the volume of

business done with other than nationally recognized suppliers. The purpose is to bring to the fore any non-publicly-held firms the company deals with where conflicts of interest might exist.

2. A review of prices paid for goods and services. The object is to see whether proper procedures have been followed and proper care taken in buying at the best prices available. Such reviews should, of course, be made periodically by officers or employees outside of the department under review. Internal auditors, for example, are in an excellent position to make them: They are usually sufficiently familiar with market conditions, sources of supply, buying policies for competitive bids, and limits of approval to make informed reviews.

Rotating Personnel

Rotation of purchasing agents is desirable, but seldom practical, because of the special knowledge they acquire of the markets and of the company's requirements. Rotation of quality inspectors and receiving clerks, however, should be instituted wherever practical as an added check.

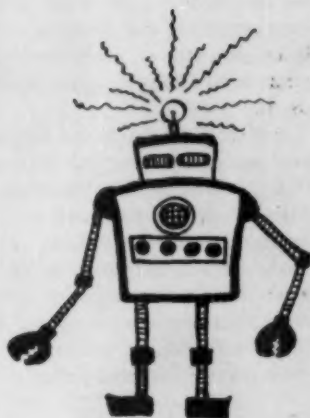
3. Making inquiries within the financial community where necessary. Admittedly, there is no known way to guarantee that outside interests will be disclosed, but chances are that "hidden interests" will not remain unobserved in responsible financial circles.

4. A review of other possibly susceptible areas. There is always the possibility that the most obvious area may not be the one where a conflict of interest exists. ♦

The New Generation of

ROBOTS

Condensed from
Business Week



IN A TEST LAB, a technician pushes a button. Two long steel fingers clamp a metal billet, swing it over to a forging press, a split-second later pluck out a finished forging, and deposit it into a container.

This mechanical hand is part of a new, fast-rising generation of robots that may soon assume a major role in research, nuclear power, industry, and underwater and space exploration. Several robot makers are now building robots more fully automatic and more versatile than any that have gone before, and a few manufacturers are adding built-in memory systems to run everything from paint spray guns to an entire nuclear power reactor.

To many laymen, a robot is a giant, clanking tin can that walks and talks its way through science fiction. By general definition, though, a robot is any mobile, automatic handling or assembly device, with seeming intelligence, that performs actions ordinarily ascribed to human

beings. Robots don't necessarily do a job faster than human beings; in many cases, robots replace men either because the environment is hazardous for people or because a routine job might pall on a worker and crimp his efficiency. A machine doesn't need long, spidery arms and giant claws to be a robot. Neither does it need remote controls to qualify, though all of these help.

Expanding Market

The market for these robots—which range from \$12,000 or so for a factory assembly unit up to \$2 million and higher for a complex nuclear reactor robot—is expanding vigorously. Annual sales are estimated at between \$5 million and \$10 million; by 1970, they're expected to hit \$85 million or \$100 million, and by

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1980, perhaps \$300 million or more. That's because three markets opening up—space, underwater, and nuclear research and power—are new fields themselves, and involve environments where only machines can usually work.

A fourth market is the biggest immediate one—industry. Although a robot doesn't promise massive economies and big time-savings, it has more subtle advantages. It can hum along on a dull, repetitive job, shift after shift without coffee breaks—and thus increase output. Robots also are flexible, as a rule, and easily reprogrammed for new duties.

Robots with Memories

That's the case with the TransfeRobot, a general purpose robot that Robodyne Div. of U.S. Industries, Inc. is producing. TransfeRobot—which costs \$15,000—differs from the usual transfer machine in that it can make almost any number of motions and, with a claw or other fixture, grab, twist, or release the work piece it's handling. The programing is done by switches on the side. Soon, Robodyne plans to announce a junior-sized TransfeRobot, selling for less than \$3,000.

Another factory robot—Unimate—is being built by Consolidated Controls Corporation. It comes complete with a magnetic drum memory that can keep track of 150 continuous sequences or moves. Consolidated says the unit can do 500 basic jobs in industry—not delicate work, like winding coils or putting miniature ball bearings together, but the heavy jobs that aren't done by machines: feeding conveyors or loading

a lathe. This is mainly where Unimate (cost: \$25,000) differs from Robodyne's TransfeRobot, which is designed for more delicate work.

The Unimate is one of the speediest robots to program. The hydraulic arm and claw are manually guided to a series of "terminal" positions; then a button is pressed to record each position on the magnetic drum. To simplify programing even more when the same job is to be done periodically, a tape or punched-card copy of the program can be read off the drum before the unit is reprogrammed for another assignment. Then when the Unimate is assigned again to the original task, the program can be fed back onto the drum automatically.

Nuclear Research

Industry may be the biggest market for robots, but it's not the biggest buyer yet. The top customer right now is the nuclear research and power field, where radioactive materials are constantly being shuffled around, machined, or repaired—all by remote control. The basic handling unit in labs and power reactors is still the original mechanical manipulator—costing anywhere from \$2,500 for a Central Research Laboratories, Inc., unit to about \$250,000 for the development model of General Electric Co.'s enormously complex Handyman. Where it can compete, however, a new family of console-controlled manipulators—operated by buttons and switches, rather than hand grips—is out to bite off some of this market.

One of the fanciest robots of this latter-day generation is Hughes Air-

craft Co.'s new Mobot Mark II. Mobot has television cameras for eyes, microphones on its "wrists," and specially jointed, six-foot-long arms to reach around or under objects. To automate it completely, a tape unit could be installed.

If these robots are getting more versatile, they're also getting bigger. The Atomic Energy Commission recently ordered the biggest yet for its experimental gas-cooled reactor going up in Oak Ridge, Tenn. The \$2 million, 350-ton giant robot will be the first of its kind for automatically refueling and servicing a reactor. American Machine & Foundry's Atomics Div. is going a step further. It is ready to build a small, completely robot-controlled boiling water reactor (SEBOR) for generating electricity or steam.

Another hostile environment made to order for robots is space. Besides the handling equipment needed for

a nuclear-power rocket, both AMF and GE are working on space robots—mainly tractor-type vehicles with arms and claws either sticking out of a turret on the top, or out of a tiny control room that is poised above the turret.

A somewhat similar robot has been designed for underwater exploration by Scripps Institution of Oceanography, and is undergoing its first extensive testing. Not only can these robots make geological studies, but they could be handy for ship salvage, warfare, retrieving test missiles, and other such jobs. There are two others churning around on the ocean floor—both with television eyes. Vitro Laboratories last year brought out its Solaris, a 500-pound device that can pick up objects weighing up to 7,500 pounds, and Vare Industries has a craft that operates without any lines at all to a mother ship and can hover like a helicopter. ♦

Chaucer, Anyone?

THE CLEVELAND Electric Illuminating Company has provided more than 500 books in open racks in their general offices for use of employees. Shakespeare, Huxley, Ibsen, Keats, Dostoevski, and dozens of other classic and great writers are represented, reports *Saturday Review*.

This is mainly the idea of Ralph M. Besse, chairman of the Cleveland Commission on Higher Education and executive vice president of the utility company. His theory: Easy access to books spurs reading and education, making better citizens and employees.

The books are lent on the honor system and no record is kept of who removes them or replaces them. This is a result of Mr. Besse's belief that "the fear of losing books has been a great deterrent to their maximum use."

Some books, unfortunately, have disappeared from the firm's unique library—85 of them altogether. Among the missing are two copies of the Bible and one *Decameron*. But other books have been added: *Lady Chatterley's Lover* has turned up—and an old, old copy of *The Bobbsey Twins*.

Tips for More Profitable Selling

Condensed from Sales Management

MANY SALES MANAGERS are on the hot seat today. They are being ordered by top management to boost profits. Some are told to watch salesmen's selling costs carefully. Others are given an edict to cut sales department costs in the coming quarter by 2 per cent, 5 per cent, 10 per cent.

The big problem for the sales manager—and for top corporate management as well—is to keep sight of the big picture constantly, to sidestep the pitfalls of negative, short-sighted cost-cutting. Sales executives from many leading companies have discovered that the most effective way to cut selling costs is through positive action. They point out that a planned, often long-range, cost-improvement program—one that may require new investments in salesmen, training, dollars, and time—is usually the best means of improving the cost-to-volume ratio and the profit picture. Here are some of the cost-improvement ideas that these top sales and marketing executives offer:

- *Look at your market potential.* Says C. K. Rieger, vice president of

marketing services for General Electric: "You don't have to cover the entire U.S. if you can't afford it. In appliances, for example, 1,000 counties out of 3,000 represent less than 5 per cent of the sales. Why not forget about these entirely and concentrate where the market really is? If you specialize in a given area you can be the leader, but if you random-shoot across the whole area you are going to be a follower."

- *Make the field sales manager profit conscious.* As Richard O. Baily, assistant vice president of marketing, Burroughs Corp., observes: "Part of the sales manager's income depends on his profit picture—not just on volume. This means concentrating and selling the most profitable lines at the expense of the unprofitable ones. Many services are being scrutinized to see which ones are no longer profit-and-sales-building services, but merely frills. These are being dropped."

- *Seek better control of the sales force.* Here, again, the emphasis is on making the sales force conscious

Sales Management (January 20, 1961), © 1961 by Sales Management, Inc.

of profits as well as volume, says C. J. Urban, marketing manager, TV and Radio Division, Westinghouse Electric Corp. He reports, "We are instituting productivity call reports as a way of getting each salesman to cut his own costs. As a result, many of them are reducing costs by as much as 25 per cent."

- *Evaluate salesmen's expenses against sales volume.* In International Business Machines Corporation's Electric Typewriter Division, says B. M. Stevens, sales manager, each field salesman's selling expenses are weighed against the sales volume he brings in. If they don't balance, the salesman is told to get his expenses in line. Stevens points out that in some cases he recommends increased expenses where the potential is not being fully realized.

The Battle Against Rising Costs

- *Maintain cost-to-volume ratios.* Gerald J. Light, vice president of marketing of Schick, Inc., believes that, with constantly increasing costs for making, distributing, and promoting products, maintaining costs is, in effect, cutting costs. Marketing, says Light, must not only achieve a lower sales-to-volume cost ratio, but must combat rising costs.

One of Schick's methods of fighting the battle of cost-to-volume ratio is readjusting sales territories. Says Light: "We are readjusting territories so that those markets that need most assistance get it, and conversely, so that markets that provide the greatest return in sales are more intensely serviced. The yield is greater, in relation to the 'mining' effort, from the good markets."

Schick is also conducting a continuing study of distribution channels. "With our variety of retail outlets—department, drug, jewelry, appliance, hardware, and specialty stores—distribution channels are particularly vital," says Light. Another weapon in the battle, he reports, is "developing a program of planned retail and wholesale calls in the field so that we make most effective use of the sales cycle. Our men concentrate on wholesale selling ahead of their retail store selling. Some industries do their seasonal buying earlier than others. Salesmen can use their time more efficiently by carefully scheduling calls—making appointments in advance."

- *Put salesmen on a straight commission basis.* To a large extent, declares Maurice L. Stonehill, president of Jeannette Glass Co., this method of compensation permits the chief sales executive to forget about field selling costs. "Because the salesman is being paid on a straight commission basis, he makes sure that his costs don't get out of line—for he has to absorb all of them out of his own profits."

Managers in the Field

- *Put managers into selling.* At Burroughs Corp., several sales and marketing managers are being transferred into sales territories as field representatives, "where their sales potential can be used to greater advantage to the company." Burroughs' Mr. Bailly points out that this was partly a result of the company's growth, which had created many levels of management. He is quick to add that the company realizes and is

generally able to cope with the motivation problems involved in what seems to be a demotion. And Burroughs is finding this an effective way of cutting middle-management fat.

- *Add more salesmen to the field.*

An effective long-range method of reducing field sales costs is to put more salesmen in the field while reducing the size of territory that each salesman has to cover. This action, says Edward C. Hewitt, vice president in charge of sales for Thomas & Betts Co., Inc., can greatly cut the time and dollars that a salesman has to invest in getting from one customer to another.

Dividing Districts

Thomas & Betts has split several field districts in recent years. In all cases, says Hewitt, the result has been an increase in both sales and profits in the district. The company will typically split an area into two parts by: (1) bringing in a new salesman to handle one of the two new subdistricts, often under the direction of the salesman who had handled the whole area; (2) guaranteeing the original salesman the same level of income. In some cases, the resultant extra selling effort—and reduced traveling effort—has boosted

the area's sales 200 to 300 per cent.

Jeannette Glass's Stonehill is the first to admit that slipshod territory management costs the company money, even though he compensates his salesmen on a straight commission basis. "The company suffers, too, if a salesman doesn't know how to manage his territory and spends too much time on the road and not enough time developing customers and prospects."

Reducing Paper Work

- *Simplify the salesman's paper work.* Reducing and mechanizing the salesman's paper work can lead to lower costs and extra selling effort. P. Stephen Harris, president, Lucky Tiger Manufacturing Co., provides each salesman with a portable dictating machine for his sales reports. Each call is recorded after the interview and each tape is wrapped in a call report that is a highlight of the tape.

The tapes are shipped to company headquarters, where they are filed. They have also been helpful in breaking in a new salesman in a territory. He simply plays back the tapes for a complete picture of what's been happening in the territory over the past several years. The "wrapper" serves as an index. ♦

WATCHING OTHER MEN WORK has become quite a project in itself, according to the British magazine, *Business*. Many building contractors erect rough platforms to enable passers-by to watch a new building going up. Recently, more sophisticated touches have been added: "public viewing platforms" with walnut veneer, daily posted progress reports on the construction, and protection from bad weather. Now a building contractor in England has provided still another lure: a closed-circuit television system that enables on-lookers to watch the workmen after the building has risen above platform level.

*Some common misapprehensions
that may be sapping the
effectiveness of today's
safety programs . . .*

Safety's Sacred Cows

By John B. Coyle

*Condensed from
American Machinist—
Metalworking Manufacturing*

MUCH OF the psychology behind today's safety techniques is based on illusion. This can be said, too, of safety statistics, of safety cost accounting, and of cherished notions about who's responsible for keeping accidents down in a company.

*American Machinist/Metalworking Manufacturing (January 9, 1961), © 1961 by
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Take, for example, the safety poster. In it, the worker is almost invariably pictured as one indifferent to danger—a man given to dropping wrenches on his fellow workers, to catching ragged sleeves in machines, to tooling a fork truck through a crowded plant like a hot rod.

Nothing could be further from the truth or more in conflict with basic human nature. A man does not divest himself of his natural interest in self preservation when he reports for work. As a matter of fact, he isn't humanly capable of indifference; no company can be as interested in his safety as he is. If he takes a safety risk, it is because he is unaware of the dangers or penalties involved.

Figures Don't Lie?

Another pet illusion in industry is the safety statistic. Too often, companies find solace in accident frequency and severity rates that compare favorably with those of other employers generally or in their own industry.

Certainly, statistics show how well one employer's accident rate compares with another's, but are they a realistic index of what the rate *should* be? Why is it that executives who view most statistical averages in other business areas with a jaundiced eye get an unwarranted sense of satisfaction from comparative safety statistics?

The quarrel is not with the statistics themselves, but with the interpretation of them. There is no reason why a chemical firm should be complacent because its accident rates compare favorably with those of the steel or textile industry. The chemi-

cal firm should compare its plant, equipment, and safety devices with those of others in its own field. If they are newer and better, the employer deserves to expect, and should insist on, a lower accident rate.

Awards, Awards

The National Safety Council offers a plaque to any company that can work so many hours without a lost-time accident—and it doesn't matter whether it's a watch factory or a steel mill. The idea is excellent, and it does promote safety, but an award to one industry may be substantially more significant than it is to another.

Under the American standard (recommended by the National Safety Council), only accidents resulting in a full day's lost time are counted. Carrying this idea to its ultimate conclusion: Accidents of less than a day's lost time don't mean a thing because they don't show up in the statistical standards.

But accidents of less than a day's severity are just the ones an employer *should* worry about. Most minor accidents are at least potential time losers. If there is anything to preventive safety measures, here is an area of golden opportunity.

Safety cost-accounting frequently gives a great deal of satisfaction to management—most of it illusory. For instance, is the repair of damaged equipment and tools included? The replacement of an injured worker? The processing of compensation claims? Idled production machines?

No. While there may be good reasons for this, it is a fact that accounting systems in most companies are not geared to costing the real expense of accidents.

A Line Responsibility

The job description of a staff safety director usually reads: "Charged with the responsibility for safety." How can this be? The responsibility for safety can only rest with the line manager—any other assignment of such responsibility is unnatural, because efficiency of operation (a line responsibility) and safety are inseparable.

Certainly, staff members can be made responsible for promoting safety, training, investigation, reporting, and making recommendations. But until the safety staff has the authority to discipline line managers, the full responsibility for safety—or the lack of it—must rest upon line management.

A Realistic Attitude

A realistic attitude toward industrial safety embraces these principles: (1) the full cost of accidents must be calculated; (2) a safety program must be dedicated to the *lowest possible* accident rate, rather than to a comparatively favorable one; (3) responsibility for safety must rest squarely on the shoulders of line executives; and, most important, (4) human instinct for safety must be recognized as the greatest preventive of accidents. ♦

MAN does not live in a world of his own; his brothers are here also.

—Dr. Albert Schweitzer

ALSO RECOMMENDED

BRIEF SUMMARIES

of other timely articles

GENERAL

INSIDE THE SOVIET ECONOMY. *Saturday Review* (25 West 45 Street, New York 36, N.Y.), January 21, 1961. 25 cents. A special report on the Soviet economy, its growth, and what it means to the free world, this issue contains articles adapted from off-the-record talks presented at the annual meeting of the Committee for Economic Development by six distinguished economists who studied sources of economic growth during a month's stay in the Soviet Union. The articles reveal new facts and figures concerning the Seven Year Plan, present close-ups of Soviet industrial and intellectual leaders in plants, scientific academies, and institutes, and divulge new impressions of production methods in the increasingly consumer-oriented economy behind the iron curtain.

STEEL: IT'S A BRAND-NEW INDUSTRY. By Charles E. Silberman. *Fortune* (Time & Life Bldg., Rockefeller Center, New York 20, N.Y.), December, 1960. \$1.25. Faced with increasing competition from concrete, plastic, and nonferrous metals, as well as from imported steel, the nation's steel industry has been fighting back so forcefully that this article forecasts an optimistic 158- to 169-million-*ingot-ton* industry by 1970. Although steel prices since 1947 have risen two and a half times as fast as industrial goods prices have, they are now holding steady despite rising labor and other costs; steel companies now make a pitch to consumers as well as to industrial

customers; researchers are creating lighter, stronger, more corrosion-resistant steels; and production is being shifted to more efficient furnaces and mills.

QUESTIONS IN COMPANY-OPERATED TRANSPORT. By Kenneth U. Flood. *Harvard Business Review* (Soldiers Field, Boston 63, Mass.), January-February, 1961. Reprints \$1.00. To aid the executive in evaluating his company's overland transportation, this article presents basic factors involved in investigating the relative merits of private and for-hire transportation equipment. Though the question of whether to buy, lease, or hire will necessarily be answered differently from firm to firm, the decision-making procedure should be fairly uniform: (1) Check the present traffic management function to see if it is effective and efficient; (2) consider long-run as well as short-run equipment needs; and (3) before making a choice, give careful attention to alternative leasing plans.

AMERICA'S NEWEST PARTNERS: CORPORATIONS AND COLLEGES. By Clarence W. Hall. *Reader's Digest* (Pleasantville, N.Y.), February, 1961. 35 cents. Believing that American businessmen have an obligation to provide funds for higher education, several top Cleveland industrialists drew up the "Cleveland Compact"—a plan for aid to education designed to be a model for corporations and communities over the nation. The

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Compact proposes that its signers agree to "corporate contributions commencing at once and increasing within three years to a minimum of one per cent of income before taxes, and thereafter

gradually increasing as the need develops." Although no publicity attended the plan's inauguration two years ago, the news has spread and support for the plan has grown steadily.

PRODUCTION

1961 FORUM ON TECHNICAL PROGRESS. *Steel* (Penton Building, Cleveland 13, Ohio), January 2, 1961. \$2.00. Predictions by 244 metalworking experts concerning technological trends and developments form the basis of this special report on technical progress in the following areas: steelmaking, nonferrous metal production, casting, materials and metallurgy, heat treating, inspection and testing, drives and controls, machining, tooling and gaging, forming, cleaning and finishing, joining and assembly, handling and packaging, lubrication, and service and maintenance. Three innovations foreseen in 1961: Teflon dies for forming titanium and stainless steel, a 30 per cent stronger ceramic cutting tool, and a new steel that combines workability with high strength.

NON-DESTRUCTIVE TESTING. *Factory* (330 West 42 Street, New York 36, N.Y.), January, 1961. Single reprints, 35 cents. No longer a laboratory curiosity, non-destructive testing is a valuable tool for improving manufacturing, maintenance, and—especially—quality control; even product design and manufacturing engineering benefit from wise use of new testing methods that don't damage or impair the items tested. This article not only explains how NDT reduces material and production costs, prevents wasted labor and machine time, and assures adequate product quality, but also describes various kinds of non-destructive testing (ultrasonic, thermal, radiation, etc.), gives their limitations and advantages, and lists sources of supply.

AUTOMATED MATERIAL CONTROL. By D. W. Shenton and H. Gleixner. *Automation* (Penton Building, Cleveland 13, Ohio), January, 1961. \$1.00. Cost-conscious managers are increasingly interested in the application of automatic control to materials handling, say the authors, who discuss concepts, techniques, and equipment involved in an automated materials handling system. They compare traditional with automatic techniques used in five steps basic to materials handling: (1) identification of items entering from production or transit; (2) dispatching of the items to storage areas; (3) storage by type, serial number, or at random; (4) recall of the items to be assembled in groups; and (5) delivery of these groups to specific shipping or production areas.

ASSEMBLY AUTOMATION RUNS ON TOY TRAIN PRINCIPLES. By C. J. Vlahos. *Mill & Factory* (205 East 42 Street, New York 17, N.Y.), January, 1961. \$1.00. Using standardized trackage and assembly stations, GE's meter department is well on its way to complete automation of the assembly and testing of watt-hour meters. Two of the twelve automation subsystems needed for the total system have been completed; each subsystem is comprised of an oval line tangent to another one, which in turn is tangent to a third, and so on. This article not only explains details of the operation of the subsystems, but also discusses how arrangements for gradual automation were made on a pay-as-you-go basis.

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INDUSTRIAL RELATIONS

HOW THE PERSONNEL DEPARTMENT CAN CUT COMPANY COSTS. *Industrial Relations News* (230 West 41 Street, New York 36, N. Y.), January, 1961. \$1.00. Shrinking profit margins are spurring personnel departments to make fresh efforts to reduce expenses, according to a recent nationwide survey, which revealed manpower utilization and employee benefits as two major cost-cutting areas. Some cost-cutting ideas mentioned by respondents were: Investigate sick claims; don't "window shop" for recruits; set up nonbargaining talks with unions to cut grievances and slowdowns; crack down on overtime; stop saving unnecessary carbon copies, routing memos to those who can't use them, etc.; and use part-time, temporary help.

A NEW DIVISION OF OCCUPATIONAL HEALTH. *Industrial Medicine and Surgery* (P.O. Box 44-306, Miami 44, Fla.), January, 1961. \$1.25. The recently created U.S. Division of Occupational Health will direct, coordinate, and develop the Public Health Service's nationwide program to protect and improve the health of American workers—

with particular emphasis on the prevention of diseases of occupational origin. An outstanding feature of the division's activities is an expanded research program designed to intensify research efforts in toxicology and in related fields of clinical medicine, engineering, chemistry, and physics; in addition, physiologic and psychologic factors in the work environment will come under more penetrating study.

1961 DIRECTORY OF OCCUPATIONAL SAFETY POSTERS. National Safety Council (425 North Michigan Avenue, Chicago 11, Ill.). Single copies gratis. A directory of 780 poster designs for many phases of occupational safety. Also featured are information on obtaining posters, tips on using them most effectively, and a subject index for locating the kind of poster desired. Categories covered are: electricity; housekeeping; materials handling—manual and mechanical; seasonal and holiday; fire and explosion; first aid and health; chemicals and gases; clothing and personal protective equipment; machinery; traffic transportation; and miscellaneous.

FINANCE

EMPLOYEE THRIFT PLANS. By Isidore Goodman. *The Journal of Taxation* (147 East 50 Street, New York 22, N.Y.), January, 1961. \$1.25. Recent rulings that permit increased voluntary contributions by employees to tax-exempt retirement funds are making contributory profit-sharing plans popular again after a long eclipse by noncontributory plans. The author limits his discussion of employee thrift plans to those that are related to profit-sharing—although they may also be set up under pension or stock-bonus plans—and gives particular emphasis to problems connected with

qualification requirements, unduly burdensome mandatory contributions, integration of benefits with those provided by Social Security, and investment in securities of the employer.

MATHEMATICAL MODELS IN CAPITAL BUDGETING. By James C. Hetrick. *Harvard Business Review* (Soldiers Field, Boston 63, Mass.), January-February, 1961. Reprints \$1.00. The use of mathematical models can supply management with a tool for decision-making at virtually all levels, from daily operations to budget allocation and long-term

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capital investment programs, according to the author. He explains how to construct and use a model in making capital investment decisions, but emphasizes that factors involved in the construction are the same ones necessary for any thorough decision-making proc-

ess. The function of management lies in defining realistic assumptions and practical operating conditions; the computer can then use this information to investigate consequences and arrive at a solution that may be modified by the executive making the decision.

FOREIGN OPERATIONS

JAPAN: A SPECIAL REPORT. *International Management Digest* (330 West 42 Street, New York 36, N.Y.), February, 1961. \$1.00. Japan is charting a new course for the 1960's—a course characterized by increasing growth and competition, soaring exports, new patterns of management, and increased efficiency among small firms. The economy is shifting from a labor-intensive light industrial and agricultural base to a capital-intensive heavy industry base; the emphasis is on liberalization, with more and more restrictions being lifted from imports, foreign exchange transactions, and foreign investment; and some companies are abandoning the tight, paternalistic "over-organization" that characterizes many Japanese firms where tradition controls hiring, firing, markets, and competition.

DEALING WITH LABOR OVERSEAS. *Business Week* (330 West 42 Street, New York 36, N.Y.), December 31, 1961. 50 cents. A rundown on the labor situation in European and Latin American countries, this article reports that the most pressing European labor problem, from the management viewpoint, is a tight labor market, while in Latin America, political and economic volatility constitute the greatest problem. A comparison of U.S. labor relations with labor relations in the other

countries reveals that, in general, the other governments play a much larger role in labor relations than the U.S. government does and often dominate collective bargaining; there are fewer strikes in their industries than in U.S. industries; and their unions compete on political rather than on directly economic grounds—although the economic emphasis is growing heavier all the time.

SUMMARY OF FOREIGN CONTROL REGULATIONS APPLYING TO IMPORTS FROM THE UNITED STATES. *Foreign Commerce Weekly* (Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.), January 23, 1961. 15 cents. Prepared by the Bureau of Foreign Commerce as an aid to exporters, this tabulation of the import and exchange permit requirements of foreign countries applies primarily to goods of U.S. origin and to other goods payable in U.S. dollars. Many countries require importers to obtain import licenses—sometimes before the order for goods is placed—and some countries also require the importer to obtain an exchange permit before he may pay for the import. U.S. exporters must therefore make certain before shipping that the foreign importer has obtained the required permit, and should insist on receiving the identifying number or symbol of the permit.

CORRECTION

An unfortunate typographical error in the February issue of *THE MANAGEMENT REVIEW* distorted the meaning of a sentence in the article, "Make Return on Investment Work." On page 77, in the sentence beginning "The profitability of assets employed can be improved in four ways," the third point should, of course, read: "By decreasing costs and expenses."

Management Looks at Consultants

(Continued from page 10)

6 per cent believed they were low. But when the companies that had recently used consultants were asked about the prices they had actually paid, the response was more favorable: Only 29 per cent felt the price they paid was high, 4 per cent believed it was low, and 67 per cent were satisfied that it was about right. Perhaps, then, the cost of consulting aid seems more frightening in contemplation than it does when all the results are in.

SEARCH AND SELECTION

When a company has taken its own pulse and decided that it may need some expert advice, how does it go about finding the right consultant for the job? To begin with, judging from results of the survey, most companies won't be interested in individual consultants, but in a consulting firm—and probably a large one. Nearly half the jobs reported in responses to the questionnaire were handled by the older and larger firms that are members of the Association of Consulting Management Engineers, and those that weren't, with very few exceptions, went to other consulting firms. Of course, most of the respondents were large or medium-sized firms, and it may be that the professors and free-lance consultants find proportionately more work among smaller companies. Nevertheless, it seems clear that established consulting firms get the lion's share of the business.

Companies that had used consultants before were naturally most influenced by their own experience when contacting a consultant to handle their assignments. More than half the respondents indicated that this was very influential in determining their choice, and the vast majority indicated that it was at least somewhat influential. Another popular means of finding the right consultant was checking with other similar companies to tap their experience. And, although consultants' advertising and publicity apparently had relatively little bearing on management's decisions, personal calls from consultants ranked high among the determining factors. These methods aren't mutually exclusive, of course; most firms used more than one, and some used many of them.

The techniques of narrowing down the field of possibilities to one choice are also varied, and more than one method is usually used. Most prominent is the use of personal interviews, followed closely by a review of the consultant's size-up of the job and checking the work that the consultant has done for other companies. Less important, but still influential, are the estimated cost and the consultant's ability to meet a desired deadline. And, of course, the company's knowledge of or experience with a particular consulting firm—sometimes a particular member of a consulting firm's staff—also has a strong bearing on the final selection.

ON THE JOB

Once the consultant has been selected, the next step is to brief him on the reasons he has been hired, and here there is little difference in approach. The respondents to the survey agreed that the consultant should be told what management considers to be the general problem, and most of them would also go into greater detail about the specific problem and the symptoms that were evident. Only one respondent thought that the consultant should just be asked to come in and look around on his own. This doesn't mean that consultants are limited to the specific area in question, however; it's always possible that the basic trouble stems from an unexpected quarter, or that the consultant may find other problems that management wasn't aware of when he was hired.

Having received his instructions, the consultant goes to work. What is expected of him? In a few cases, management wants only information and an analysis of the problem, but in an overwhelming majority, the consultant is also expected to come up with some concrete recommendations for dealing with the trouble. At this point, the consultant's job is over in most companies; about 55 per cent of the respondents don't want any operational assistance. A large (45 per cent) minority, however, would like the consultant to stay on long enough to help put his recommendations into effect, at least on occasion or when he is requested to do so.

Any situation in which an outsider recommends changes that will affect the firm's staff could be expected to cause strained relations between employees and the consultant, so it's rather surprising to find that this seldom seems to be the case. The vast majority

of respondents (71 per cent) reported that their relationships with consultants were ordinarily quite friendly; 22 per cent said that consultant-client relations were matter-of-fact; and only 7 per cent reported strained relations. One respondent noted that strains may well occur on lower levels; on the whole, however, the prevailing atmosphere seems to be one of amicability, perhaps because con-

WHAT CONSULTANTS WORRY ABOUT

An idea of the problems that consultants face, the complaints they have about the executives they work with, and the aspects of their own profession that cause them concern can be gained from the following observations, which are based on written statements received from twelve prominent consultants.

- *Consultant #1:* The consulting profession needs to establish and maintain high standards of practice; to inaugurate budget help for smaller clients; and to establish a clearinghouse for the inquiries of prospective clients.
- *Consultant #2:* Clients should understand that the consultant's major service is objective analysis rather than hand-holding; that difficulties in getting and keeping a complete staff are aggravated by clients who hire the consultant's staff away; that per diem pricing is sometimes a poor return to the consultant, in view of the savings he makes possible for his client; and that competition from nonprofit and tax-supported institutions is difficult to combat.
- *Consultant #3:* Main problems are maintaining level work loads to make it possible to carry a competent staff; big firms with questionable ethics and small firms that lack qualifications; companies that try to handle problems with

(Continued on next page)

sultants, by the very nature of their work, must know how to win acceptance of their ideas if they are to be at all successful.

This is not to say that things are always sweetness and light between consultants and company managements. The box on pages 65-67 includes some of the complaints consultants have about the managements they work with. On the other side of the coin,

WHAT CONSULTANTS WORRY ABOUT (Continued)

their own less skilled employees, or let troublesome situations go too long before calling a consultant.

- *Consultant #4:* Biggest problems are recruiting, training, and selection of staff; combating high-pressure selling in the scramble for clients, as more and more people get into consulting work; keeping abreast of new management techniques; training specialists to become generalists as well; and raising ethical standards to the level of other professions.
- *Consultant #5:* Chief observations: Consultants must earn, not declare, their professionalism; it is difficult to know the market for consulting aid, since managements don't advertise their troubles; consultants must be analysts, not hand-holders; clients sometimes misuse the consultant's recommendations, then blame the consultant for poor results; high-pressure selling is a problem, but it is difficult to restrict sales methods; subsidized competition, seasonal and cyclical variations in demand, and financing also present problems.
- *Consultant #6:* Consulting needs professionalization and qualifying procedures; a reliable association for individual consultants; the "education" of potential users, including government; and improvement in the quality of consulting work. Problems are caused by unethical organizations that offer "free" advice, unqualified part-timers, and captive or internal consultants.

some of the executives who responded to this survey also have a harsh word or two to put on the record.

Some of these words concern the capability of consultants. Both among companies that had used a consultant recently and among those who had never hired one, a sizable group felt that some consultants aren't what they represent themselves to be: About 67 per

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- *Consultant #7:* Consulting's basic problems are finding qualified staff associates; practical professionalization; encouraging consultants to contribute to original research; tax treatment of consulting partnerships and individuals.
 - *Consultant #8:* Main problems are the lack of ethics in the field; unqualified personnel; lack of sensitivity to the human relations function; failure to "sell" clients on recommendations; cut-raters' competition.
 - *Consultant #9:* Major problems lie in the development of services oriented to industry's needs; recruiting of able staff; establishment of performance standards; realistic planning; administration of operational improvements.
 - *Consultant #10:* Main problem is finding staff men who can think and write, are oriented to human relations, will meet schedules, and can maintain high standards of performance.
 - *Consultant #11:* Consultants need to define the profession, act professionally, set standards, establish educational requirements, build training techniques, and pioneer in new management techniques.
 - *Consultant #12:* Chief concerns are establishing a blue-ribbon organization for smaller consulting firms and developing of generalist services for small and medium-sized companies.

cent of all respondents believe that a small minority of consultants are fakes, and 27 per cent think that this is true of a "substantial number"! Only 2½ per cent believe that there are no phonies at all in the consulting ranks. Another group (about 3½ per cent of the respondents) think that *most* consultants are fakes—and, not surprisingly, these companies wouldn't be caught dead with a consultant on the premises.

Although it is true that most managements seem to feel that most consultants are on the up-and-up, the fact that more than a quarter of the respondents believe that a substantial number of them are flying under false colors could suggest that the consulting business may need some housecleaning—and better public relations. Along these lines, proposals that consulting become a certified profession have popped up from time to time, but the impracticalities and difficulties involved have prevented the idea from gaining much headway. Although this would certainly do much to insure a high degree of professional qualification among consultants, little enthusiasm for the plan is evident from this survey: About a quarter of the respondents think that consulting should become a certified profession; another quarter think it shouldn't; and fully half either aren't sure or don't know.

OLDER AND WISER HEADS

Another sore point with many executives is the question of the age and experience of consultants. All the respondents believed that experience was highly important in a consultant, but 31 per cent felt that consultants were lacking in this vital attribute. As one executive put it, "For the most part, the management consultants who have attempted to sell their services to us are not competent to judge [our] operations, having had no experience in our line." Another, an executive in a company that had just spent more than \$50,000 on a consulting job, complained that the consultants "came in knowing little about our problems, talked to the help, repeated their opinions, and closed knowing no more than when they came. A complete waste of money."

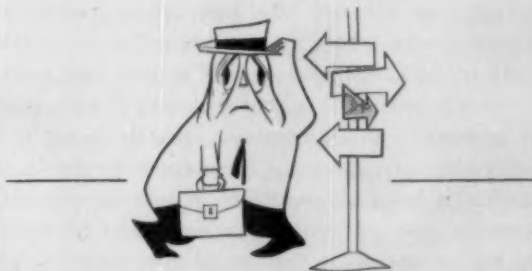
In this era of emphasis on the vigor and capability of youth, it is perhaps surprising to find complaints about young consultants, but dissatisfaction on this score is also evident: About 14 per cent

of the respondents felt that consultants are "too young" to handle the job. And, at the other end of the scale, 1½ per cent felt that consultants are too old. On the whole, however, the feeling among the respondents to this survey is that a man's age is of little importance, as long as he has the necessary experience to be competent in the areas about which his advice is needed.

CONSULTANTS—HERE TO STAY

Despite these rough spots in the road, it seems unquestionable that management consulting is here to stay—and business is the better for it. Perhaps the greatest accolade to arise from this survey lies in the answers to the final question. Asked if, given the same circumstances and problems, they would hire the same consultant all over again, fully 88 per cent of the respondents answered yes—and others, who apparently were disappointed in the particular man they had worked with, would nevertheless give the job to another consultant.

This represents a rather substantial vote of confidence in consultants, and one that is evidently justified by the results that have been achieved. There is little doubt that the consulting profession will continue to grow to keep pace with business—and, with the increasing complexity of methods and procedures, the expansion and diversification of many companies, and the rapid changes that new technology is bringing, businessmen will welcome all the help they can get. Carefully selected and wisely utilized, management consultants will be the means by which many executives can get that help and insure the progress of their companies in the competitive years ahead. ♦



Rebuilding Customer Confidence

(Continued from page 20)

that dealer service schools may be held on a regularly scheduled basis.

The service department is responsible for parts as well as for people. Probably nothing is more infuriating to an otherwise happy customer than to discover he cannot have something repaired because the manufacturer has no parts available. The manufacturer has a real responsibility to maintain the availability of parts for all the models he has manufactured, as long as there is a reasonable expectation that these parts might be needed.

The Cost of Service

This aspect of the business cannot be placed strictly on a dollars-and-cents basis. It is true that it is costly to maintain a supply of parts for a product that may not have been marketed within the past 20 years. It is true that it is more costly to maintain a supply of parts when only 200 a year are sold than it is to handle a part with a sales volume of 2,000 per year. But it is also true that, in terms of customer satisfaction, people who have old and obsolete models cannot safely be overlooked.

To illustrate: The Maytag Company has been in the home laundry business for 53 years, but we feel that it is our responsibility to make parts available as long as there are people with Maytag appliances who need those parts. Last year we sold five cranks for Model 70 washers—which were introduced in 1919. To go even further back, Maytag was in the farm-implement business for some years before starting to make washing machines. In 1959, we had a request for a part for a handy little piece of equipment called the Hawkeye grain grader, which was last manufactured in 1900. We didn't have it in stock, but we were able to make one, and we filled the order—at a substantial loss, but with considerable pride.

This is admittedly an extreme case, but the point is that any manufacturer who is really going to subscribe to the ideal of customer satisfaction has a responsibility to make it possible for any of his customers to secure repair parts for any of his products that are still in regular use. He cannot afford to become a target for the

"Improvements in product should be made available to the public whenever they are developed . . . and this kind of product improvement and development cannot be tied to a specific annual date . . ."



critic who says, "My appliance isn't worn out, but I can't fix it because repair parts are no longer available."

PLANNED OBSOLESCENCE

Finally, we come to a subject that has been widely scored by critics of management—and not without justification. This is the theory of artificial obsolescence and annual model changes—and it affects every aspect of consumer satisfaction.

The concept of artificial obsolescence represents an attempt to obscure the real differences between actual functional improvements and mere surface or stylistic changes. Customers are strongly motivated to buy a new product when it is evident that it will do certain things that weren't possible with older models—when there is a real and demonstrable difference between new models and those that were previously on the market. This is true obsolescence. But the efforts in many industries, and in some segments of many other industries, to make last year's models artificially obsolete by introducing "new" models annually has turned the customer into a price-conscious bargain hunter—one who is always certain he can do better down the street. Moreover, annual face-lifting requires constant retraining of the dealer's sales force on new and sometimes dubious sales features, and tends to destroy the very elements of creative salesmanship that have contributed so much to our economic development.

Improvements in product should be made available to the public whenever they are developed, as soon as they have been thoroughly tested—and this kind of product improvement and development cannot be tied to a specific annual date. Moreover, every change does not call for the introduction of a "new" model. Since its introduction

nearly three years ago, for example, Maytag's current automatic washer has not been superseded or replaced by any newer model, yet it has undergone 449 specification changes—42 of which are highly significant because they remove certain potential service problems or solve some that had been encountered in the field.

Manufacturers can do a better job of quality control when their manufacturing processes, their assembly lines, and their sources of supply are not regularly upset every twelve months by an annual model change. To put it bluntly—when a manufacturer with several models in his product line brings out a complete set of new models every calendar year, they come out too fast for “de-bugging,” and the consumer is not getting the quality he is entitled to.

TIME WELL SPENT

The manufacturer who wants to build consumer confidence and satisfaction must be willing to spend the time necessary to meet his responsibilities. It takes time to perfect a new design; it takes time to test a new product; it takes time to develop a new manufacturing technique and process; it takes time to find all the ways in which highly complicated products can be refined and improved to the highest possible degree. It takes time—but it pays off in terms of customer satisfaction.

This is a problem that is being tackled in many industries. A giant furniture manufacturer has developed a system of fabric controls to reduce upholstery complaints. A major automobile manufacturer has developed a system of quality audit that rejects any finished car that has more than 35 demerits; two or three years ago, a score of 75 demerits was considered pretty good. Another auto maker is developing a system of reliability control to replace decisions depending upon human judgment. A camera company has publicly stated that it will not be panicked into bringing out a new product too soon just to meet competition.

Concern for product quality is not new, but perhaps it is accurate to say that more people are publicly concerned with this aspect of business than ever before. This is as it should be, for consumer satisfaction is the reason for the existence of every business. We can never forget that a successful business enterprise has always been one that can discover, create, and satisfy customer needs. ♦

Measure Your EDP Progress

(Continued from page 26)

- What has happened to the accuracy of reports, paychecks, etc., produced by the computer?

Analysis of answers received can provide an insight into the real success of the chosen applications.

Integration of Applications

A third aspect of the subject of applications that warrants evaluation is the extent to which applications have been effectively integrated. Some of EDP's greatest value lies in its capacity for consolidating separate information files and for performing interrelated series of operations without manual intervention. The exploitation of both of these opportunities should be studied during the EDP audit. Many inventory control applications can be defined to permit not only the calculation of quantities of material to be procured but the automatic preparation of purchase orders to initiate the filling of these needs. For many insurance companies, computers represent a chance to break down the dozens of files that exist—name and address records, dividend files, loan files, premium payment records, etc.—and develop one master record system. These are but two ways computers can “integrate” data-processing activities.

Systems Assistance

The final facet of applications that should be explored is the quantity and quality of systems help provided by your computer supplier. Most hardware manufacturers today realize that they are not selling machines, but information systems. Implicit in this recognition is a willingness to aid as objectively as possible in the choice of applications, in system analysis, and to some extent in actual programming. The EDP audits of many companies have probed this area thoroughly, not to cast blame, but to insure that adequate assistance is provided for subsequent efforts.

HARDWARE APPRAISAL

The third part of the EDP audit is an appraisal of hardware. This, in turn, breaks into two main areas of inquiry: past hardware per-

formance and the potential impact of hardware improvements on the future computer plans of the company.

Past Performance

Most companies have maintained complete and accurate "logs" on computer usage. The EDP audit examines these records to establish the levels and trends in the computer's performance. Capacity utilization, the percentages of "down" time for preventive and unscheduled maintenance, and "lost time" because of machine error are reviewed, and indices are developed for the various elements of the total system—input, main frame, output.

In analyzing this kind of material, significant conclusions can often be drawn by comparing the performance of each computer system that the company has installed, by comparing the performance of the company's computers with similar systems in other companies, and by analyzing trends in the performance of a particular installation.

Where there are indications that hardware performance has been less than satisfactory, the audit identifies the causes. More importantly, however, it should also determine what has been done, if anything, to obtain assistance from the hardware manufacturer to correct any persistent difficulties.

Hardware Advances

A more significant part of the hardware phase of the EDP audit is an assessment of the implications of technological advances for a company's data-processing system. Three characteristics of computer technology make such an assessment advisable: First, the technology is fast-moving, ever-changing. Commercial electronic data-processing is still in its infancy, and already the industry is talking about its third generation of computers. Second, the computer industry is becoming increasingly competitive. Although still dominated by a single company, several other industrial giants have entered the field for keeps. Moreover, many important technological improvements in hardware were initially introduced by smaller manufacturers. And third, the procurement lead time for most computer systems is at least 18 months, which means that a company must always be thinking ahead when it comes to hardware.

These three factors make it desirable for a company to conduct a continuous evaluation of the significance of new hardware developments. For example:

- What do the advances in optical scanning equipment mean to your company?
- Have random-access memories been developed to the point of practical application for your organization?
- What impact do recent improvements in communications devices have on your company?
- What will the development of "real time" computers mean in terms of your data-processing requirements?

In many large corporations with successful computer installations, it is common practice to find one or two people assigned on a full-time basis to keep up on hardware advances and interpret these advances for their company. Such an approach is invariably more constructive than relying solely on the computer manufacturers' sales representatives to bring word of new developments.

ORGANIZATIONAL IMPLICATIONS

The manner in which a computer group is organized and the effect (if any) that a computer system has on the total organization structure of the company can and does vary from firm to firm. For this reason, there are no tangible standards by which to audit this aspect of a computer project. Nevertheless, organization structure is a subject of considerable interest to management and, if for no other reason than this, most productive EDP audits include an inquiry into the organizational implications of the computer.

Four facets of the subject deserve particular attention: (1) location of computer (or data-processing) department in the corporation; (2) internal organization of the computer department; (3) impact of the computer on the organization of other departments of the company; and (4) status of computer personnel management.

Location of Computer

Typically, most computers have been an administrative responsibility of a company's financial group. While this can be an appropriate organization location, there are conditions under which such an arrangement impedes rather than facilitates effective exploitation

of the computer's potential. These conditions usually involve the personality, interests, and company status of the controller or financial officer and the nature of the applications chosen for computer processing. When the controller is accounting-oriented, rather than management-oriented, or when he is subordinate to rather than a peer of other department heads, chances are good that the computer will not be used to its best advantage. Similarly, if the applications are largely operating in nature (rather than financial), there may be merit in organizationally locating the computer away from the company's financial group.

Internal Organization

The crucial aspects of organization in the computer department itself are the relationships between systems analysts and programmers on the one hand, and between the various segments of machine operations (computer, conventional tabulating equipment, and communications) on the other. The comprehensive audit determines the clarity with which the responsibilities of these various groups are defined and the extent to which coordination of their efforts has been achieved.

Impact on Company Structure

The advent of the computer may ultimately have far-reaching effects on corporate organization structure. To date, largely because of the routineness of most applications, this impact hasn't been felt. Notable exceptions exist, however. A manufacturer of missile-system components found that its computer system had such an effect on the entire information flow of the company that a separate management information department (built around a computer and communication network) was created. This department has effectively eliminated the independent paperwork-processing units that formerly existed in each operating department.

A life insurance company consolidated its policyholder service and accounting activities from over 200 offices to 35 regional centers. Although computers were not involved at the time, a key reason for the shift was to anticipate the day when computers and communication systems would make a more dramatic consolidation possible and desirable.

The EDP audit might not disclose any immediate organizational steps that should be taken, but it can alert management to the nature and scope of change that may be required in the future.

Personnel Management

To complete the organization phase of the audit, it is usually sound to examine the personnel policies and practices with respect to computer personnel. Questions that might be asked include:

- Are there clearly defined recruiting standards for computer programmers? Analysts? Operators? Have these been validated in any way?
- What kind and quality of training is provided for computer personnel?
- What has been the turnover experience with computer people? How does it compare with the company as a whole? With other technical groups? With other companies?
- What is the status of unionization of any or all parts of the computer organization?

COMPUTER ECONOMICS

The EDP audit should, as its final step, strike a "trial balance" on the financial plusses and minuses of computer utilization. Although many, if not most, computer installations have been established for reasons other than dollar savings, an estimation of the net costs will permit management to reach an informed judgment on whether the intangible benefits of the computer are worth its measurable costs.

In approaching this phase of the EDP audit, companies have found it best to concentrate on approximate rather than precise dollar figures. This is especially true when determining savings, which are often difficult to define and measure. Costs—both capital investments and operating expenses—are relatively easy to pin down.

In identifying savings, it is sometimes helpful to sort them into several categories:

- Net payroll reduction (or gain) in the data-processing organization (machine operators, key punchers, analysts, etc.).
- Net machine rental reduction (or gain) in the data-processing organization.

- Net reduction or gain in other expenses (punched cards, printing forms, heating, air conditioning, etc.) of the data-processing department.
- Net payroll reduction (or gain) in departments outside the data-processing department (production scheduling analysts, payroll clerks, sales statistical clerks, etc.)
- Other measurable reductions or gains (reduced carrying charges because of lower inventory levels, receivables, etc.).

Once these savings have been roughly determined, they should be segregated into those that could have been obtained only by use of the computer and those that might have been achieved by the application of imaginative, forceful systems improvements. Such a segregation helps management focus on the intrinsic benefits of the computer, even though many people will argue, and with some justification, that savings due to system improvements would not be achievable without the discipline imposed by the installation of a computer.

Installation Costs

The process of determining costs of a computer installation is far simpler; the only cautions, based on the experience of firms that have audited their computer efforts, are to separate one-time investments from recurring operating expenses and to include some of the less obvious—though equally direct—costs that are occasionally overlooked. For example: make certain that amounts spent for magnetic tape are included. Some very large installations have investments of \$250,000 in tape alone. Also, do not overlook site-preparation costs. Installation of air conditioning equipment, construction of a raised floor and a false ceiling, etc., can run to significant amounts.

After identifying all costs and savings, it is possible to calculate the company's return on its investment or its payout period by any of several conventional methods. Generally, however, it is sufficient to use the dollar data to answer these questions:

- Has the company recovered its initial investment in the computer?
- In terms of present operations, does the company have a net annual gain or loss?

- What are the likely future financial implications of presently installed computers?

The other important financial aspect of computer installations that the EDP audit should explore is the issue of "lease or purchase." Now that all computer manufacturers offer genuine alternatives of buying versus leasing equipment, this is a real decision area. The answer will be different for every organization, turning on such factors as the utilization of specific pieces of hardware and the tax practices of the company. The important thing for the EDP audit to do is not to reach a conclusion but to determine if the issue has been fairly and recently examined.

BLUEPRINT FOR ACTION

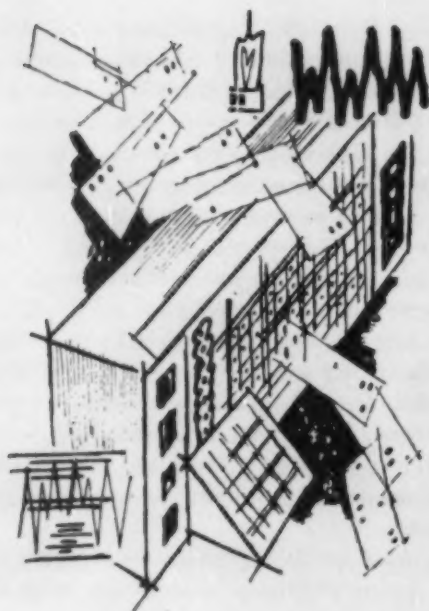
Aside from this basic approach to an EDP audit, perhaps the most critical issue is the question of who should conduct the study. Most organizations that have undertaken the project have used teams instead of assigning the task to a single individual. In naming individuals to a task force, an effort should be made to meet these criteria:

- *Objectivity.* Above all else, the audit team must be able to take an independent point of view. They must be able to pinpoint problems, recommend changes, and conduct their evaluation on a level that transcends company politics.
- *Stature.* The individuals who take part in the EDP audit should be of sufficient stature in the organization to deal effectively with department heads in face-to-face interviews and with top management in presentations.
- *Knowledge.* The team must have a thorough understanding of computers and their applications, and of the company's decision-making processes and information flow. Such knowledge commands respect and facilitates acceptance of the team by personnel in the company's data-processing organization.
- *Articulateness.* Finally, the team should have in some of its members a capacity for written and/or oral communication that will permit the group to express its findings clearly and convincingly.

Admittedly, these are difficult criteria to meet, but an EDP audit conducted by a team with lesser qualities can be an instrument of

confusion. Invariably, the required skills can be obtained by blending the individual talents of people selected from various parts of the company on a full-time or temporary basis to conduct the audit.

For guidance, the audit team requires two things from top management. The first is a "charter" that spells out the purpose and scope of the audit. This often takes the form of a company-wide announcement. The second is a timetable, with the key date being the time when some form of final report or presentation is due. Within these ground rules, the audit task force can proceed with its five-step study to measure the company's EDP progress, to identify its problems, and most importantly, to develop a blueprint of positive action to strengthen areas of weakness and capitalize on points of strength. ♦





SURVEY OF BOOKS FOR EXECUTIVES

Two Views of Scientists in Industry

ORGANIZATIONAL SYSTEMS AND ENGINEERING GROUPS: A Comparative Study of Two Engineering Groups. By Louis B. Barnes. Harvard Business School, Division of Research, Soldiers Field, Boston 63, Mass., 1960. 190 pages. \$3.00.

THE SCIENTIST IN AMERICAN INDUSTRY: Some Organizational Determinants in Manpower Utilization. By Simon Marcson. Industrial Relations Section, Princeton University, Princeton, N.J., 1960. 160 pages. \$3.00.

*Reviewed by Philip Marvin**

HERE ARE two attempts to come to grips with a question that is already of serious concern to management and bids fair to become even more

pressing: How can industry best manage the work of its scientists and engineers? Both these books are reports on research studies, and both authors have thus taken on the uncomfortable dual job of providing a basis for further work by sociologists and at the same time showing managers how they can improve their handling of the situation. In the latter respect at least, Professor Barnes, author of *Organizational Systems and Engineering Groups*, has come off much the better.

An assistant professor of business administration at the Harvard Business School, he has studied the organizational system of engineering departments in two different corporations to determine the effects of organization on the way people work and on the satisfactions they get from their work.

Professor Barnes is to be complimented for helping the reader who is a manager rather than a scholar to

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understand some of the differences between the language of the business world and the language of sociology. Other industrial researchers might gain the wider readership they deserve among businessmen if they took a cue from Professor Barnes and provided their readers with glossaries of sociological terms. Among the words and phrases he defines are *regulars*, *nonregulars*, *nonwork activities*, *reference group affiliation*, and *status congruence*—all of which are important to an understanding of the discussion presented.

In other respects, however, Professor Barnes does not do so well by management. At the outset, he makes this statement: "The scientist-engineer in industry often assumes the paradoxical position of looking down upon his superiors in higher management. Scientist-engineers see management as anti-intellectual and motivated by money alone. Management pictures professional employees as narrow, impractical specialists."

A statement such as this ignores the fact that in the modern technical organization the scientist-engineer himself becomes a manager almost as soon as he has demonstrated his technical abilities and, so that his own effectiveness may be multiplied, he is given an increasing load of managerial responsibility in accordance with the amount of technical proficiency he shows. The gulf between managers and scientist-engineers, then, is not nearly so wide as the author perceives it.

In another place, he cites a survey that found that scientists and engineers wanted less pressure from man-

agement, greater freedom, and more flexible work schedules. In other words, Professor Barnes has discovered human nature. Typists and management consultants, he might have found, want the very same things. He may want them himself. Scientists and engineers certainly aren't unique in this respect.

Despite these flaws, *Organizational Systems and Engineering Groups* represents a courageous attempt to deal with some tough problems in the supervision of technical people and reflects an unusually good appreciation of the relative importance of these problems to the engineering manager. The two engineering groups in which the research was conducted provide a valuable study in contrasts. One was strongly controlled by top management, while the other displayed "high autonomy, inter-actions beyond those required by the job, and a mutual influence between status levels." In comparing them, Professor Barnes tries to determine whether technical programs should be directed primarily from above or primarily from within, which mixture of the two will best serve the corporation's objectives, and what organizational patterns lead to the greatest productivity in the engineering organization.

In the early chapters, he compares the organizational systems of the two companies and the value systems of science and business and presents a conceptual scheme for studying behavior in groups. Then he describes the organization of the two departments, devoting a separate chapter to questions of status, reference group affiliation, and social structure in De-

partment A. Next comes an exploration and explanation of the two kinds of organization and their implications. In his final chapter, Professor Barnes summarizes some of the implications of his study for management and for future research. At this stage of the investigation, the implications for behavioral scientists outweigh those for managers, but this imbalance is due to the magnitude of the job to be done and in no way reflects upon Professor Barnes' work. He has made a good start.

Professor Marcson, on the other hand, can be taken to task for the paucity of his contribution to management, for it seems clear that *The Scientists in American Industry* could have been a more helpful book than it is. A research associate in the Industrial Relations Section of Princeton University and acting chairman of the Department of Sociology at Rutgers, the author has endeavored to look at the industrial research laboratory through the eyes of those who work there by interviewing the scientists and research administrators in one particular laboratory for a period of about a year.

It seems almost as though this were the first time the author had ever been exposed to the industrial research climate. In this reviewer's opinion, however, he will have some very substantial contributions to make once he has spent time in a number of other industrial research laboratories. No one can achieve the perspective necessary for a book with so wide a scope from a series of interviews in a single laboratory. As Professor Marcson continues his work,

he will probably become aware of the shortcomings of his present contribution.

Its underlying flaw is its failure to recognize that industrial research, like any other industrial activity, is basically a means by which management attempts to produce the largest possible profit on the available capital. Professor Marcson appears to be disturbed by this profit motive. "The professional," he points out, "was conceived of as a person with autonomy, free to pursue his research whims or practice medicine or law as he saw fit within the ethical canons of the respective professional organizations."

But the industrial research laboratory caters to these whims only insofar as they promise some contribution, short-range or long-range, to its profit-oriented product objectives, and any manager who misses this point will soon find himself replaced by men whose sights are fixed on the objectives of the business. Because of his reluctance to accept this, Professor Marcson is frequently misled and confused by the comments of technical people who are themselves badly oriented to their jobs and should be either set straight about their function or dismissed in the interests of the over-all effectiveness of the laboratory.

His analysis covers a good deal of ground: the goals of industry and its research components, the organization of the industrial research laboratory, laboratory management, the career development of scientists, the professional needs of the scientist, work groups, and research pathways. The

succeeding interpretation centers on two themes: the opposition within the laboratory of two systems of authority—executive authority and colleague authority—and the sources and management of strain.

No one who has been responsible for the administration of research programs is unaware of the conflicts Professor Marcson discusses. Research administrators would gladly eliminate them, if they could—and if, in so doing, they could still be sure that their laboratories would contribute enough to the company's profit to justify the appropriation of the funds they need. In order to insure profitable research results, the administrator must interpret the objectives of the company to the research group and modify some of these objectives as the unfolding of technical programs demands.

In other words, the administrator must keep policies and functions in a delicate state of balance. Professor Marcson finds that this creates conflicts and strains. But competition itself is conflict and strain. When these aren't carried into the industrial research laboratory to some degree, the laboratory isn't geared to company needs.

Furthermore, some of the strains and conflicts Professor Marcson cites are ludicrous. He explains, for example, that scientists in the company studied felt slighted because certain senior staff members had private offices "with a secretary or a secretarial staff in the outer office" and air conditioning, while they themselves did not. He quotes one of them as saying that this disparity "expresses the

management's conception of them." Moreover, he says, the scientists' "feelings of deprivation are increased by the view that the research function is the fundamental activity of the laboratory, and administration only a supplementary service." Following this line of reasoning, it could equally well be argued that, because the primary function of Rutgers is education, Professor Marcson's office should be large and luxurious, while the administrative executive, the president, should have his desk in a crowded room with the rest of his "service" team.

Professor Marcson concludes by asserting: "Certainly our analysis has indicated that the present laboratory organization is productive of strain that has consequences for the scientist's career and research aspirations. Perhaps our present industrial laboratory is not an adequate model."

Let this reviewer introduce another "perhaps": Perhaps Professor Marcson has inadvertently overlooked the fundamental fact that the objective of the industrial research laboratory is to contribute to the company's profits. Therefore, the researcher, like any other worker in a profit-centered organization, must subordinate some portion of his personal career interests and aspirations to this corporate goal.

Though Professor Marcson's analysis is in many ways faulty, the data he has collected provide an excellent basis for further study, and he himself shows promise of eventually being able to offer valuable guidelines for the management of industrial research.

The Staff Assistant

STAFF IN ORGANIZATION. By Ernest Dale and Lyndall F. Urwick. McGraw-Hill Book Company, Inc., 330 West 42 Street, New York 36, N. Y., 1960. 242 pages. \$6.00.

*Reviewed by Carter C. Higgins**

"The load on top management' is not a fiction invented by theorists in organization; it is a pressing reality in too many businesses. In the use of general staff officers with troops, the armies of the world have invented and developed a device for unloading the detailed aspects of commanding from the commander himself. It is a device which works."

This quotation from *Staff in Organization* well describes the subject of this book. Of the two authors, Dr. Dale is the well-known consultant and professor at the Cornell business school, and Colonel Urwick, Chairman of the Board, Urwick, Orr & Partners, served as a General Staff Officer with the British Army in wartime. Their collaboration is a fruitful one.

No attempt has been made to cover the whole field of staff and line relationships in business management. Rather, the aim is to emphasize the use of the "assistant to" as a means of increasing top management effectiveness. The writing is clear and well ordered and—with the possible exception of a lengthy

chapter on the military use of staff, which is rather rough going—the progression of ideas flows freely.

The growing specialization and functional organization of business, as well as the increasing demands on chief executives to represent their companies to the public, industry, trade organizations, unions, and government, impose a heavy load on top management these days. Many members of the Young Presidents' Organization complain that the day-to-day demands on their time displace the more vital aspects of the longer-range planning they should be doing. Almost uniformly, they wish that their secretaries could handle details of their jobs that in fact are beyond the capabilities and status of secretaries. They are bothered, too, by the difficulties of self-coordination among too many executives on the same level.

"So-called 'administrative distance' is created not by levels on an organization chart, but by the fact that the chief has no time to maintain easy personal contacts with his immediate subordinates," Dale and Urwick point out. Even with an assistant-to, they stress, "The chief must continue to lead; to initiate plans and stimulate his subordinates; to interpret ideas, plans, and policies to them, acting as teacher and counselor; to represent the organization as a symbol or image; and to keep in touch with, and have the proper 'feel' of, the grass roots. Only when the chief leads in this sense can the general staff function effectively."

* President, Worcester Pressed Steel Company.

One might wish, perhaps, that the authors had given us even more information than they have on what aspects of the top manager's job can be delegated to general staff assistants. Usually included among these activities are fact-finding, mail-winning, keeping and devising records, follow-up, studying markets and technical developments inside and outside the company, attending meetings, and so on. Sometimes such assistants also have corporate responsibilities for such functions as public relations or personnel. These topics are concisely covered, with due recognition to the personal preferences of the chief involved.

In discussing the qualifications of successful assistants-to, the authors cite various case histories in support of their view that the job calls for an objective viewpoint, more than average intelligence, and acceptance by higher-rated executives with established responsibilities. The job is, in fact, a valuable training ground for generalists—usually the more capable assistants—to move out, after two or three years, into line responsibilities.

Many chief executives and department heads should set aside their prejudices and look with more open minds at the assistant-to concept. *Study of Staff in Organization* would be a good way to begin.

Baedeker of Communications

EMPLOYEE COMMUNICATIONS IN ACTION. By Robert Newcomb and Marg Sammons. Harper & Brothers, 49 East 33 Street, New York 16, N. Y., 1961. 337 pages. \$5.75.

*Reviewed by Carl C. Harrington**

Here, at last, is the Baedeker of employer-employee communications—a book that first encourages the manager to build or improve his communications and then shows him how—with no pussyfooting or wasting of words.

Ten years ago, the husband-and-wife consulting firm of Robert Newcomb and Marg Sammons published

their first book on employer-employee communications. This was then a new science, an area of industrial relations that afforded many opportunities but few precedents. Taking on the role of missionary, the Newcomb-and-Sammons team tried to persuade management that communicating with employees is not only good practice but also good business.

Today, management is almost universally aware that some form of planned communications is essential to good employee relations. Unfortunately, many companies go no farther than this, for they are stumped by the question: "What is the most effective way of going about it?" *Employee Communications in Action* holds the answer.

* Editor, *Mill & Factory*.

The authors frankly acknowledge the reluctance of many companies to take action and, in fact, put their finger on one of its causes—management's insistence on precedent. "Sound managements," they write, "seek precedent in communication: What companies have tried this before, for how long, and with what results? What is there to gain? What is there to lose, and what are the pitfalls revealed by experience?"

In response to this need, they show precisely what has been done and what is being done. They describe the management philosophy, the method, the results—in both large and small companies, in both large and small communications programs.

Most articles on employee communications describe its application only to large, multiplant companies, or are based solely on the experience of people who work for large companies and who sometimes tend to look at the problems of individual plants through the wrong end of the telescope. The authors of this book, however, have clearly acknowledged the wide horizons of the subject. They discuss the communications program not only of the sprawling industrial empire, but also of the medium-sized concern and of the operation with only a handful of employees. The reader will have no trouble in finding the shoe that fits. As the authors have properly pointed out, "Managements with sound, resultful programs of communication have not plunged into them. They have carefully evaluated each new device. They have studied it, researched it, surveyed it, probed it

with the objectivity of the physician appraising the human heart."

This book consists of 20 chapters of crisp, factual writing. Thanks to their more than 20 years of plant experience, the authors have been able to separate the significant from the insignificant, and they present a maximum of usable guidance in a minimum of space. Each chapter deals with one or more topical problems and their step-by-step solutions: communications and collective bargaining; how to discuss employee benefits; problems posed by automation; cost-reduction campaigns and how to handle them; the employee annual report and the recruitment manual; the supervisor's role in communication; and how to combine oral and written programs.

One of the plus features of the book is the series of recommendations presented at the end of each chapter. Here, in slam-bang style, the authors summarize the chapter and give the reader ten guideposts to follow. Take this sample from the end of Chapter Three: "Spend money on communication, but spend it wisely. Don't saddle the program with a dime-store budget. Good employee relations are as important as sales. If you don't have the first, you won't have the second for long."

Employee Communications in Action is directed primarily at upper levels of management, the authors say. But it should also appeal strongly to people involved in employee communications in other ways. Because it backs up much of what management is trying to say, companies might well consider giving copies to

all their supervisors. Certainly, the book is a "must" for every public relations manager and house organ editor. And it belongs in every company library, where it will undoubtedly find wide use as a reference source.

Like any other book, this Newcomb-Sammons product has its faults.

One is that it occasionally digs so deep into procedures that the reader becomes a little dazed. The book also gets repetitious in places, though mostly about matters that management may need to be constantly reminded of. But these are small flaws in a book as useful as this.

Briefer Book Notes

(Please order books directly from publishers)

FIGHTS, GAMES, AND DEBATES. By Anatol Rapoport. The University of Michigan Press, Ann Arbor, Mich., 1960. 400 pages. \$6.95. An attempt to explain human conflict on all levels by means of formal mathematics. Analyzing conflicts in terms of three categories, Dr. Rapoport presents mathematical models of the first two—fights and games—and offers as a model for the third the debate between collectivism and individualism. Once we understand conflicts, he suggests, we may be able to turn a fight—even on the global level—into a game, and thence into a debate.

THE RIGHT APPROACH FOR JOB SEARCHERS. By E. A. Butler. Business Consultants Publishing Company, 510 Madison Avenue, New York, N. Y., 1960. 85 pages. \$2.95. Offers practical advice for people seeking jobs at the training and middle-management levels.

EFFECTIVE BUSINESS SPEECH. (Fourth Edition of *Practical Business Speaking*.) By William Phillips Sandford and Willard Hayes Yeager. McGraw-Hill Book Company, Inc., 330 West 42 Street, New York 36, N. Y., 1960. 445 pages. \$6.75. This extensively revised edition incorporates much fresh material on business interviews, conferences, and group discussions. It includes a new chapter on persuasive interviews other than sales presentations, a transcript of a brainstorming session, and the script of an award-winning college discussion.

MANAGEMENT AND CORPORATIONS 1985. Edited by Melvin Anshen and George Leland Bach. McGraw-Hill Book Company, Inc., 330 West 42 Street, New York 36, N. Y., 1960. 253 pages. \$5.50. A report on a symposium at which 15 authorities explored the nature and role of the business corporation and its managers a generation hence. Included are seven papers on such topics as the role of computers and their impact on managers, the corporation in a democratic society, management of the multinational corporation, the Western corporation and underdeveloped economies, and the conditions and destination of business education.

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